

Message

From: O'Lone, Mary [OLone.Mary@epa.gov]
Sent: 10/1/2014 4:04:16 PM
To: Wooden-Aguilar, Helena [Wooden-Aguilar.Helena@epa.gov]
Subject: Re: Professor Wing's TED talk on NC CAFOs

Also, did you have a chance to check whether there is a complete set of the exhibits in V's hard copy? Did you let them know the electronic version was incomplete when you sent them the email that you'd get back to them?

I'd like to see what the missing declarations say.

Mary O'Lone
Civil Rights and Finance Law Office
Office of General Counsel
US EPA
1200 Pennsylvania Ave., NW
Washington, DC 20460
(202) 564-4992

From: Wooden-Aguilar, Helena
Sent: Wednesday, October 1, 2014 11:22 AM
To: O'Lone, Mary; Covington, Jeryl; Farrell, Ericka
Subject: RE: Professor Wing's TED talk on NC CAFOs

Interesting. Thanks!

From: O'Lone, Mary
Sent: Wednesday, October 01, 2014 11:22 AM
To: Wooden-Aguilar, Helena; Covington, Jeryl; Farrell, Ericka
Subject: Professor Wing's TED talk on NC CAFOs

As soon as Dan mentioned this TED talk to me, I knew it was Dr. Wing.

Dr. Wing is the lead author of many of the NC based studies of health & other impacts cited in the REACH complaint. It is his & his colleagues work & comments on the draft general permits that forms the substantive basis for the complaint.

The talk is only about 10 minutes and provides an overview of the issues discussed in the complaint.

His explanation of how the NIEHS funded study was conducted makes it sound very similar to the exposure assessment that ATSDR did in Corpus Christi (remember Ericka?). I think the study he is talking about is Exhibit 50 - the one published in 2008.

Mary O'Lone
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1200 Pennsylvania Ave., NW
Washington, DC 20460
(202) 564-4992

From: Isales, Daniel
Sent: Wednesday, October 1, 2014 10:28 AM

To: O'Lone, Mary
Subject: FW: CAFOs

Daniel L. Isales
U.S. Environmental Protection Agency
Environmental Science Center
701 Mapes Road
Fort Meade, MD 20755-5350

(410) 305-3016
isales.daniel@epa.gov

From: Isales, Daniel
Sent: Monday, September 29, 2014 7:54 AM
To: Julia Rhodes
Subject: CAFOs

Julia,

I know the hog farms case has not even been accepted, but thought you might be interested in this video from a college professor regarding hog farms in NC. Obviously he is advocating a specific point of view, but may still be of interest. It is a relatively short video.

<http://tedxtalks.ted.com/video/Community-Health-Impacts-of-Fac>

Here is the related journal article:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2446444/>

Hope you are well, Dan

Daniel L. Isales
U.S. Environmental Protection Agency
Environmental Science Center
701 Mapes Road
Fort Meade, MD 20755-5350

(410) 305-3016
isales.daniel@epa.gov

Bcc: Wooden-Aguilar, Helena[Wooden-Aguilar.Helena@epa.gov]
Cc: Covington, Jeryl[Covington.Jeryl@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]; Yon, William[Yon.William@epa.gov]
To: Dorka, Lilian[Dorka.Lilian@epa.gov]
From: Wooden-Aguilar, Helena
Sent: Thur 9/24/2015 12:59:38 PM
Subject: Re: REACH - March 6th as the date the 180 clock was tolled.

Ok. I guess it was removed.

Helena Wooden-Aguilar

Acting Director

Resource Management Staff

Office of Criminal Enforcement, Forensics and Training

U.S. Environmental Protection Agency

202-564-0792 (office)

Ex. 6 - Personal Privacy

wooden-aguilar.helena@epa.gov

On Sep 24, 2015, at 8:56 AM, "Dorka, Lilian" <Dorka.Lilian@epa.gov> wrote:

I remembered that it should be in a footnote too but when Jeryl read back the footnotes yesterday it was not clear.

Sent from my iPhone

On Sep 24, 2015, at 8:51 AM, Wooden-Aguilar, Helena <Wooden-Aguilar.Helena@epa.gov> wrote:

Ok.

Will - please get the REACH SCAP from Ericka or Jeryl. The language of when we write the letter should be in a footnote.

Helena Wooden-Aguilar

Acting Director

Resource Management Staff

Office of Criminal Enforcement, Forensics and Training

U.S. Environmental Protection Agency

202-564-0792 (office)

Ex. 6 - Personal Privacy

wooden-aguilar.helena@epa.gov

On Sep 24, 2015, at 8:45 AM, "Dorka, Lilian" <Dorka.Lilian@epa.gov> wrote:

If that's the case then let's go ahead and say that in this letter too. And Helena and Will, we should include that in the CRM and SCAP I think?

Sent from my iPhone

On Sep 24, 2015, at 8:41 AM, Covington, Jeryl <Covington.Jeryl@epa.gov> wrote:

I recall and as noted below, that Will Hall stated that the letter should be issued after the mediator is selected.

From: Dorka, Lilian

Sent: Thursday, September 24, 2015 8:39 AM

To: Covington, Jeryl; Farrell, Ericka; Wooden-Aguilar, Helena

Cc: Yon, William

Subject: Re: REACH - March 6th as the date the 180 clock was tolled.

Ex. 5 - Deliberative Process

Sent from my iPhone

On Sep 24, 2015, at 8:36 AM, Dorka, Lilian <Dorka.Lilian@epa.gov>

wrote:

Ex. 5 - Deliberative Process

Sent from my iPhone

On Sep 24, 2015, at 7:51 AM, Covington, Jeryl
<Covington.Jeryl@epa.gov> wrote:

Ex. 5 - Deliberative Process

From: Dorka, Lilian
Sent: Wednesday, September 23, 2015 9:44 PM
To: Farrell, Ericka
Cc: Covington, Jeryl
Subject: Re: REACH - March 6th as the date the 180 clock was tolled.

Thanks Ericka! Let me know if you think, after you talkers GC, we all need to have a conversation with them. Thx!

Sent from my iPhone

On Sep 23, 2015, at 11:45 AM, Farrell, Ericka
<Farrell.Ericka@epa.gov> wrote:

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

From: Golightly-Howell, Velveta
Sent: Friday, August 21, 2015 10:21 AM
To: Rhodes, Julia
Cc: Covington, Jeryl; Dorka, Lilian; Temple, Kurt; Wooden-Aguilar, Helena; O'Lone, Mary; Moffa, Anthony; Farrell, Ericka
Subject: Re: REACH - March 6th as the date the 180 clock was tolled.

Thanks Julia. Velveta

Sent from my iPhone

On Aug 21, 2015, at 8:46 AM, Rhodes, Julia
<Rhodes.Julia@epa.gov> wrote:

Hi Velveta, CRFLO is still reviewing the letter and will be cognizant of the interests expressed in your email as we do so.

Julia Rhodes

Assistant General Counsel for the Civil Rights
Practice Group

Civil Rights and Finance Law Office

Office of General Counsel

Environmental Protection Agency

1200 Pennsylvania Avenue, NW, 2399A

Washington, DC 20460

Phone: 202.564.1417

From: Golightly-Howell, Velveta

Sent: Thursday, August 20, 2015 6:40 PM

To: Covington, Jeryl

Cc: Dorka, Lilian; Temple, Kurt; Wooden-Aguilar, Helena; Rhodes, Julia; O'Lone, Mary; Moffa, Anthony; Farrell, Ericka

Subject: Re: REACH - March 6th as the date the 180 clock was tolled.

Ex. 5 - Deliberative Process

Velveta

Sent from my iPhone

On Aug 20, 2015, at 12:59 PM, Covington, Jeryl
<Covington.Jeryl@epa.gov> wrote:

For consideration-

Ex. 5 - Deliberative Process

Ex. 5 - Deliberative Process

From: O'Lone, Mary
Sent: Thursday, August 20, 2015 10:54 AM
To: Covington, Jeryl
Cc: Rhodes, Julia
Subject: FW: REACH - March 6th as the date the
180 clock was tolled.

Jeryl-

Ex. 5 - Attorney Client

Ex. 5 - Attorney Client

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: O'Lone, Mary

Sent: Friday, March 27, 2015 4:26 PM

To: Golightly-Howell, Velveta; Wooden-Aguilar, Helena; Matthew, Dayna; Dorka, Lilian

Cc: Rhodes, Julia; Covington, Jeryl; Farrell, Ericka; Moffa, Anthony; Hall, William

Subject: REACH - March 6th as the date the 180 clock was tolled.

We in OGC are all about providing our client's defensible options.

Ex. 5 - Attorney Client

Ex. 5 - Attorney Client

Have a good weekend. Mary

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: Hall, William

Sent: Friday, March 27, 2015 11:29 AM

To: O'Lone, Mary

Subject: RE: Questions about dates

I understand that you're wanting to put a date on the start of the convening process. OCR's emails to the complainants and recipient indicating that OCR had asked me to contact them went out on March 6. I would consider that the start of the convening process.

Will

William E. Hall, Ph.D.

Conflict Prevention and Resolution Center

U.S. Environmental Protection Agency

"Making Agreement Easier" | (202) 564-0214

<http://intranet.epa.gov/adr> or <http://www.epa.gov/adr>

From: O'Lone, Mary

Sent: Thursday, March 26, 2015 12:00 PM

To: Hall, William

Subject: Questions about dates

Will-

You had your first solo follow up with NC DENR
on what date?

And the date when you had your first solo follow-
up call with Earthjustice?

I am trying to nail down when “convening” was
underway.

Thanks, Mary

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

<11R-14-R4 ADR Vaart (08202015).docx>

<11R-14-R4 ADR complainant
(08202015).docx>

<11R-14-R4 ADR Vaart (08202015).docx>

<11R-14-R4 ADR complainant (08202015).docx>

Bcc: Wooden-Aguilar, Helena[Wooden-Aguilar.Helena@epa.gov]
Cc: Matthew, Dayna[Matthew.Dayna@epa.gov]; Golightly-Howell, Velveta[Golightly-Howell.Velveta@epa.gov]; O'Lone, Mary[o'lane.mary@epa.gov]; Rhodes, Julia[Rhodes.Julia@epa.gov]; Covington, Jeryl[Covington.Jeryl@epa.gov]; Farrell, Ericka[Farrell.Ericka@epa.gov]; Moffa, Anthony[Moffa.Anthony@epa.gov]
To: Dorka, Lilian[Dorka.Lilian@epa.gov]
From: Wooden-Aguilar, Helena
Sent: Fri 4/10/2015 12:53:49 PM
Subject: Re: REACH draft email for OW

Thanks but can't take credit for what Mary drafted. Thanks should go to Mary.

Helena Wooden-Aguilar
Assistant Director
External Civil Rights - US EPA
202-564-0792 (office)

Ex. 6 - Personal Privacy
wooden-aguilar.helena@epa.gov

On Apr 10, 2015, at 8:47 AM, "Dorka, Lilian" <Dorka.Lilian@epa.gov> wrote:

Agree, good draft. Thanks Helena!

From: Matthew, Dayna
Sent: Friday, April 10, 2015 8:33 AM
To: Wooden-Aguilar, Helena
Cc: Golightly-Howell, Velveta; O'Lone, Mary; Dorka, Lilian; Rhodes, Julia; Covington, Jeryl; Farrell, Ericka; Moffa, Anthony
Subject: Re: REACH draft email for OW

This is a well constructed email in my opinion Helena. Nice job.

Sent from my iPhone

On Apr 9, 2015, at 5:12 PM, Wooden-Aguilar, Helena <Wooden-Aguilar.Helena@epa.gov> wrote:

Velveta, I have confirmed with Mary and below is the email to send to Mike Shapiro.
Please let me know if you have any questions.

Helena

Ex. 5 - Deliberative Process/ Atty Client

Helena Wooden-Aguilar

Assistant Director

External Civil Rights - US EPA

202-564-0792 (office)

Ex. 6 - Personal Privacy

wooden-aguilar.helena@epa.gov

Begin forwarded message:

From: "O'Lone, Mary" <o'lane.mary@epa.gov>

Date: April 9, 2015 at 11:21:30 AM EDT

To: "Wooden-Aguilar, Helena" <Wooden-Aguilar.Helena@epa.gov>

Subject: FW: REACH draft email for OW

This most recent one is in the chain below. But since that time we've determined an earlier tolling date is appropriate, so I edited it to accommodate that and to shorten it overall.

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Avenue, NW

Washington, DC 20460

(202) 564-4992

From: O'Lone, Mary

Sent: Wednesday, March 25, 2015 8:44 AM

To: Wooden-Aguilar, Helena

Cc: Matthew, Dayna

Subject: REACH draft email for OW

Helena -

Per the list of REACH items from last week, here is a draft of an email to Mike Shapiro from you.

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Ave., NW

Washington, DC 20460

(202) 564-4992

Message

From: Wooden-Aguilar, Helena [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=991AB84F64BE4B6B9DD10A68C81887B0-HAWODD]
Sent: 4/9/2015 2:58:37 PM
To: O'Lone, Mary [o'lonemary@epa.gov]
Subject: FW: draft REACH email for OW DCRO (Mike Shapiro)

This is the last email I have below re OW. Is this correct?

From: O'Lone, Mary
Sent: Monday, March 02, 2015 4:44 PM
To: Dorka, Lilian; Wooden-Aguilar, Helena
Cc: Rhodes, Julia
Subject: Fw: draft REACH email for OW DCRO (Mike Shapiro)

I think Mike fell through the cracks b/c Lilian made the edit & I said great. Then I just adjusted all the future ones to include the Lilian language. I didn't resend the Mike one to you Helena, I just assumed you would use the Lilian edited version. So it fell through the cracks in the flurry of emails on the 20th.

So, Velveta should follow up with Mike using the basic email below asking for the contacts.

Mary O'Lone
Civil Rights and Finance Law Office
Office of General Counsel
US EPA
1200 Pennsylvania Ave., NW
Washington, DC 20460
(202) 564-4992

From: O'Lone, Mary
Sent: Thursday, February 19, 2015 1:46 PM
To: Dorka, Lilian; Wooden-Aguilar, Helena
Cc: Rhodes, Julia
Subject: RE: draft REACH email for OW DCRO (Mike Shapiro)

Lilian's edit is great.

In response to Helena's question, I am tailoring the emails b/c we do know we want a few specific things from OAR & R4.

More to come.

Mary O'Lone
Civil Rights and Finance Law Office
Office of General Counsel
US EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-4992

From: Dorka, Lilian
Sent: Thursday, February 19, 2015 1:31 PM

To: Wooden-Aguilar, Helena; O'Lone, Mary
Cc: Rhodes, Julia
Subject: RE: draft REACH email for OW DCRO (Mike Shapiro)
Importance: High

Ex. 5 - Deliberative Process

From: Wooden-Aguilar, Helena
Sent: Thursday, February 19, 2015 1:17 PM
To: O'Lone, Mary; Dorka, Lilian
Cc: Rhodes, Julia
Subject: RE: draft REACH email for OW DCRO (Mike Shapiro)

Great. Can we use this for each poc?

From: O'Lone, Mary
Sent: Thursday, February 19, 2015 1:16 PM
To: Wooden-Aguilar, Helena; Dorka, Lilian
Cc: Rhodes, Julia
Subject: draft REACH email for OW DCRO (Mike Shapiro)

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Mary O'Lone
Civil Rights and Finance Law Office
Office of General Counsel
US EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-4992

Message

From: Wooden-Aguilar, Helena [Wooden-Aguilar.Helena@epa.gov]
Sent: 3/2/2015 9:45:09 PM
To: O'Lone, Mary [OLone.Mary@epa.gov]
CC: Dorka, Lilian [Dorka.Lilian@epa.gov]; Rhodes, Julia [Rhodes.Julia@epa.gov]
BCC: Wooden-Aguilar, Helena [Wooden-Aguilar.Helena@epa.gov]
Subject: Re: draft REACH email for OW DCRO (Mike Shapiro)

Ok. Thx

Helena Wooden-Aguilar
Assistant Director
External Civil Rights - US EPA
202-564-0792 (office)

Ex. 6 - Personal Privacy

wooden-aguilar.helena@epa.gov

On Mar 2, 2015, at 4:43 PM, "O'Lone, Mary" <OLone.Mary@epa.gov> wrote:

I think Mike fell through the cracks b/c Lilian made the edit & I said great. Then I just adjusted all the future ones to include the Lilian language. I didn't resend the Mike one to you Helena, I just assumed you would use the Lilian edited version. So it fell through the cracks in the flurry of emails on the 20th.

So, Velveta should follow up with Mike using the basic email below asking for the contacts.

Mary O'Lone

Civil Rights and Finance Law Office

Office of General Counsel

US EPA

1200 Pennsylvania Ave., NW

Washington, DC 20460

(202) 564-4992

From: O'Lone, Mary
Sent: Thursday, February 19, 2015 1:46 PM
To: Dorka, Lilian; Wooden-Aguilar, Helena
Cc: Rhodes, Julia
Subject: RE: draft REACH email for OW DCRO (Mike Shapiro)

Lilian's edit is great.

In response to Helena's question, I am tailoring the emails b/c we do know we want a few specific things from OAR & R4.

More to come.

Mary O'Lone
Civil Rights and Finance Law Office
Office of General Counsel
US EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-4992

From: Dorka, Lilian
Sent: Thursday, February 19, 2015 1:31 PM
To: Wooden-Aguilar, Helena; O'Lone, Mary
Cc: Rhodes, Julia
Subject: RE: draft REACH email for OW DCRO (Mike Shapiro)
Importance: High

Ex. 5 - Deliberative Process

From: Wooden-Aguilar, Helena
Sent: Thursday, February 19, 2015 1:17 PM
To: O'Lone, Mary; Dorka, Lilian
Cc: Rhodes, Julia
Subject: RE: draft REACH email for OW DCRO (Mike Shapiro)

Great. Can we use this for each poc?

From: O'Lone, Mary
Sent: Thursday, February 19, 2015 1:16 PM
To: Wooden-Aguilar, Helena; Dorka, Lilian
Cc: Rhodes, Julia
Subject: draft REACH email for OW DCRO (Mike Shapiro)

Ex. 5 - Deliberative Process/ Atty Client

Ex. 5 - Deliberative Process/ Atty Client

Mary O'Lone
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1200 Pennsylvania Avenue, NW
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(202) 564-4992

EPA

Moderator: Jonathan Stein

05-12-16/11:05 a .m. ET

Confirmation # 160552132

Page 1

EPA

Moderator: Jonathan Stein

May 12, 2016

11:05 a .m. ET

Operator: This is Conference #160552132

Conference record has joined the conference.

Ericka Farrell: Hello?

Jill Johnston: Hello. This is Jill Johnston.

Mary O'Lone: Hi Dr. Johnston. Is Marianne on the line yet?

Marianne Engelman Lado: OK, you know what? We were mute. My apologies. So this is Marianne Engelman Lado from Earthjustice and I'm here with three colleagues and I'll let them introduce themselves.

Alexis Andiman: This is Alexis Andiman, also Earthjustice.

Brent Ducharme: Brent Ducharme from the UNC Center for Civil Rights.

Elizabeth Haddix: And Elizabeth Haddix, also from the Center for Civil Rights.

Marianne Engelman Lado: Hi there. Who's there at EPA?

Ericka Farrell: OK. We got Ericka Farrell from OCR, Title VI Office.

Jeryl Covington: Jeryl Covington from OCR Title, VI Office.

Mary O'Lone: This is Mary O'Lone. I'm from the Office of General Counsel.

Johanna Johnson: Hi. This is Johanna Johnson also from the Officer of General Counsel.

Marianne Engelman Lado: Hi there. Thank you.

Ericka Farrell: OK. Good afternoon. Again, this is Ericka Farrell from the Office of Civil Rights, Environmental Protection Agency in Washington, D.C. and thank you for taking the time to talk with us. And please be aware that this interview of Dr. Jill Johnston is being recorded. And, are there any objections to recording this interview?

Jill Johnston: No.

Marianne Engelman Lado: Dr. Johnston, do you have any objections?

Jill Johnston: No I guess.

Ericka Farrell: OK. Thank you. And, as you know, your August 2014 study was submitted to OCR to rely upon in this investigation and so whether North Carolina Department of Environmental Quality Regulations of swine feeding operations discriminate against African-Americans, Latinos, and Native Americans on the basis of race and national origin in neighboring counties and violation of Title VI and EPA's implementing regulations. And today we plan to ask some – ask you some fundamental question. I'm sorry, foundational questions, regarding the study in order for the OCR to determine whether we can rely on this study for our investigation. And in doing so, we are trying to understand what issues and arguments may be raised in opposition to your study. And we may need to ask you further questions at a later date.

And as we get started, we're going to start right now, Dr. Johnston with just some basic background questions. And can you please state for the record your name.

Marianne Engelman Lado: I'm sorry. Ericka – Ericka, if I can just interrupt you for a second. I just want to make sure, there were two studies that Dr. Wing and Dr. Johnston did conducted and then we submitted. One was the 2014 which you mentioned and the other was the revised version that's dated that it was exhibit 12 to a submission earlier this year. And it was dated October 19th, 2015 and it's based on that current set of hog facilities that are under the general permit. I just want to make sure both are in front of you.

Mary O'Lone: Well Marianne, the other one is not. The second only update. That's going to be one of our question. I'm sorry. This is Mary O'Lone. That was going to be one of our questions. Jeryl is now looking to see if we have it in our record.

Jeryl Covington: Right. As if Exhibit 12, that's the declaration by **Citizen Name / Ex. 6**

Mary O'Lone: No. She sent on something –

Marianne Engelman Lado: So Jeryl, is not Exhibit 12 to the complaint. It's attachment 12 to a subsequent submission that we made in 2016 that contains Steve Wing's declaration and it contains the revision of the study.

Mary O'Lone: What's the date of that because they're shaking – this is Mary again, their shaking their heads like OCR doesn't have it.

Marianne Engelman Lado: April 12th, you did received it. I'm certain of that. April 12, 2016. And it had – and this is attachment 12. And it's important, you know, we'll get into the methodologies and all that. But you know, we wanted to make sure that there was a study of the actual data under the new permit. And this revised study is based on that, the data under the new permit.

Mary O'Lone: OK.

Marianne Engelman Lado: And we should go ahead even if you can't find it, you can ask questions based on the first study and we can resume at another time. That will still be helpful I'm sure. But it's important that you have that second study.

Mary O'Lone: Are you, Marianne – this is Mary again, are you at your desk? I mean can your e-mail it to Jeryl?

Marianne Engelman Lado: Yes.

Mary O'Lone: E-mail it to all of us so that at least we know we have it. They'll go back and look for it. But I just want to make sure that we do get it today. But I also agree with you. Because I think unless the methodology changed from the report submitted with the complaint to today, the questions would be the same. It's just a matter of the conclusions or results, right? That's what would have changed potentially.

Marianne Engelman Lado: That's right. I mean, I'll let Dr. Johnston speak and she'll answer specific questions about that. But the basic methodology is the same – there was – there may have been some tweaks that when you focused on it, she can answer questions about. So Alexis is forwarding it and – who's – so who's going to – if they look for an e-mail who would it be from?

Alexis Andiman: Is there just one e-mail I can send it to you and I'll just forward it to you right now.

Marianne Engelman Lado: Who should we send that for?

Mary O'Lone: Covington.jeryl.

Marianne Engelman Lado: OK. Got that.

Mary O'Lone: @epa.gov.

Jeryl Covington: We do not – yes, we do not received that. I don't have a copy of that.

Mary O'Lone: Okay. So back to the beginning.

Ericka Farrell: Yes. For the record, Dr. Johnston, can you please provide your full name?

Jill Johnston: Jill Elizabeth Johnston.

Ericka Farrell: And please provide your professional contact information, specifically your office address and office telephone number and office e-mail.

Jill Johnston: Yes. It's 2001 North Soto Street, Los Angeles, California 90089. My office phone number is 323-442-1099 and my e-mail is jillj@usc.edu.

Ericka Farrell: Thank you. And as we begin, can you also state what your current professional position is?

Jill Johnston: An Assistant Professor of Preventive Medicine in the Division of Environmental Health at the University of Southern California.

Ericka Farrell: OK. And as we begin, also, can you give us what your professional background is in relation to the studies that we're going to be talking about today.

Jill Johnston: Yes. I have a PhD in Environmental Science and Engineering with the minor in public policy from the University of North Carolina at Chapel Hill and also completed a Post-Doctoral Fellowship in Environmental Epidemiology also at UNC.

Ericka Farrell: OK. And now, I'm going to turn this over to Mary O'Lone.

Mary O'Lone: So this is Mary O'Lone. Dr. Johnston, Marianne's probably explained to you one of the reasons that we wanted to speak with you. And after we go through the questions that we have, you can see why it was very good idea for us to speak to you first. Because what we wanted to do when Marianne explained **Ex. 6 Privacy** and that you know, if we had a chance to speak with him in the future, we wanted to try to limit the questions that you know, we would be asking him. So, we really appreciate you taking yourself available to answer these questions with us. Because I think, there are a lot of them and a lot it comes from the fact that we don't have a particular background on this. So, we're going to ask you probably some very basic questions from your perspective.

Jill Johnston: OK.

Mary O'Lone: But the first one is your role in the – we're going to talk first about the 2014 study. And your role in that study.

Jill Johnston: Yes, so I collected the data and conducted the analysis in consultation with Dr. Wing and created that the table and the figures in this report and help with drafting the text. But Dr. Wing took the lead on writing the text for this.

Mary O'Lone: OK. Was this study peer reviewed or did it go through any kind of even informal internal sort of peer review?

Jill Johnston: There was discussion with other faculty within our department at University of North Carolina but it was not submitted or considered under scientific peer review process for a journal.

Mary O'Lone: OK. And we might as well ask the update that was done. Is it similar?

Jill Johnston: Yes, (inaudible) it was probably not submitted or have been under a scientific peer review.

Mary O'Lone: OK. Do you – and Marianne I don't know if this is – this is may be a question for you. I don't know if it's for you or Dr. Johnston, but was the – was the 2014 study submitted to North Carolina DEQ?

Jill Johnston: No.

Mary O'Lone: OK. Or do you know if they're aware of it?

Jill Johnston: Not to my knowledge.

Mary O'Lone: OK. All right. Now we're going to get into sort of a knots and bolts of the questions that we had about the study itself. So, Dr. Johnston, do you know – can you explain why three miles was chosen as the distance?

Jill Johnston: Yes, so we based that on a few (inaudible) peer reviewed scientific studies. One is by Mirabelli from 2006 that specifically looked at asthma prevalent in middle school students in North Carolina and found that middle schools within a three mile radius of an industrial hog operation had higher prevalence of asthma, and other asthma related symptoms, compared to students who went to school further away. Also some dispersion modeling of hydrogen sulfide conducted of at a large hog CAFO in Iowa show that hydrogen sulfide can travel up to 6 kilometers which is a little over three miles from the facility itself and impact air quality in that radius. And there was also sort of two other studies that looked at, the relationship between hydrogen sulfide protections and hog CAFOs one from North Carolina and one from Iowa. The one from North Carolina being by Guidry in 2016 and then by Pavilonis in 2013 that used 5 kilometers as their distance.

Mary O'Lone: OK. Thanks. Did you by any chance look at other distances or analyze other distances that weren't discussed in the 2014 report?

Jill Johnston: So we did not. We considered different criteria for inclusion of census blocks, you know, whether any part was within three miles or whether they're centroid. But we didn't have a capacity to compare our three mile results to two miles or one mile or some other criteria.

Mary O'Lone: OK. How was –the basic question, how was the block centroid determined? Was it geographic, location or?

Jill Johnston: Yes. So (inaudible) our GIS software with you know, the census block data from the U.S. and to 2010. And then, yes, the program assigned the centroid.

Mary O'Lone: So it assigned that based on the geographic center of the block not something to do with the population.

Jill Johnston: It had nothing to do with population, yes. It had to do with what the spatial definition of where the centroid would be based on the shape of the block.

Mary O'Lone: OK. For the study area, 19 counties were excluded that didn't have an IHO and didn't border one. Why was it important to exclude those 19?

Jill Johnston: We thought it appropriate to consider population that were potentially at risk for being near an industrial hog operation. And so, just the geography and mountainous nature of Western North Carolina, you know, as well as highly urbanized areas. Or just not locations where CAFOs would be sited. So we didn't consider those population at risk and that did not include them in the study area for this analysis.

Jeryl Covington: Yes. This is Jeryl Covington. I do have one question on that one. You all were also excluding the counties that were adjacent to and had no – please give – can you explain the basis for that exclusion as well to the 19 counties in the Western North Carolina area.

Jill Johnston: So we excluded counties where they had to meet two criteria. One is they had no CAFOs in their borders and no adjacent county for them had any CAFO. And it's largely because these areas are highly mountainous and don't have the facilities or the land mass that you need for the liquid waste distribution system for a CAFO to be permitted there.

Mary O'Lone: Ok?

Jeryl Covington: OK.

Mary O'Lone: This is Mary again. What is the – can you explain the adjustment for rurality and is that the same thing as adjusting for population density. And then why was that appropriate?

Jill Johnston: Yes. So – yes. The – so the content of rurality we measured it by population density for each census block. And we find this – and so we present both the unadjusted and the adjusted values in the report. But find that this is important because the land availability and also typically the price of land is highly influence by the population density in the amount of land that is available. And also different patterns of which racial or ethnic group within which areas can be – can influence population density as well. So that's why we – we chose that content of both the marker of kind of the economics and the land availability to adjust for in the model.

Jeryl Covington: This is Jeryl again, could you – could you clarify the land availability. I wasn't quite clear on that explanation.

Jill Johnston: OK. Yes, so, I mean. As I mentioned before, not only do you need the barns to house the animals but then also you know, fields around it where the waste is sprayed. So an area with the high population density, you're not going to have – it's not necessarily going to be appropriate to have the space availability to put a CAFO in those areas or to put as many. And – it's basically, the land available for agriculture can basically correlated with the population density of that area.

Mary O'Lone: But that was – OK. This is Mary again. Because I – you can't see me but my brain is cranking very slowly. But, so this is not because you were excluding these areas because you've already excluded the 19 counties that have nothing. Now you're doing an adjustment to say, to basically say that OK, in the – to find that the... the more sparsely populated – maybe we'll get into when we get back into the table in explaining those. But I'm trying to understand the fundamental points of why you did it. And it is to say that these things tend to go in really rural areas. And you know, as we look at areas they get more and more rural, we also see, you know, where they are, the amounts of hogs there are and a change in the demographics. That's why you're doing the rurality piece to it?

Jill Johnston: Yes. And it's sort of a concept of, I guess they're familiar with confounding and other epidemiological models. So we felt that population density is a very important factor that influences the siting of hog CAFOs. And so, that's why we presented sort of adjusted models to acknowledge the fact that population density as sort of a proxy for both the cost of land and the sort of amount of land that would be available for either agricultural activity was important to consider when we're looking at the association between race and permitting of hog CAFOs.

Marianne Engelman Lado: This is Marianne. Can I jump in for a sec. On page 4 of the 2014 reports, Dr. Johnston, you have –there's a sentence there that says, by adjusting for populations density or rurality, we compare racial vulnerability that IHOs for racial groups within each level of rurality –

Jill Johnston: Right.

Marianne Engelman Lado: I think that's what you're getting at. Can you explain that a little bit more that is – so it's not taking away the salience of race but testing for it by looking within each level of rura..., I can't even say the word, rurality. Is there still salience of race towards this outcome? Is that right?

Jill Johnston: That is correct and we try to provide an example here that perhaps is a little bit more intuitive. But for example, like when you're looking at mortality rates and you want to compare across two different populations. It's important to account for age because of risk of mortality changes with different age groups. And so if the age structure of the two populations

aren't equal, you want to address for those factors or account for those factors so that you can look within each age group. So essentially, we're trying to account for the same thing here that acknowledges that perhaps your risk for a CAFO being permitted nearby you is different depending on the population density of the area where you live. And so by including that adjustment, we can account for those differences across different areas in North Carolina.

Mary O'Lone: OK. Is everybody good on that right now? OK. OK. Can you explain the study state live weight calculation? So we're on page 4 again of the 2014 study. And how did you determine whether the study state live weight of an IHO should be included and I – this is – it's not about the calculation of the city state live weight but more – how you captured a particular IHO. And I sort to have two visual images in my mind. And one has – you take the centroid of a block and you draw a circle three miles out, right?

Jill Johnston: OK.

Mary O'Lone: This is what I'm thinking happened. And the latitude and longitude of any IHO that fell within that three mile circle is what you counted. Is that right?

Jill Johnston: That is correct. And it was some, but yes. We started the centroid of each block. And did exactly what you describe.

Mary O'Lone: Because, well we were trying to figure out whether there was anything – whether it was like if you had, instead you were pulling, if there were a block that straddled the three mile circle, you know, you would pull an IHO that might be sitting in that block. Do you know what I mean? But that's not what you did. You just – it was if the latitude and longitude of that CAFO fit in the circle. Then it was added to the total weight.

Jill Johnston: Yes. So in essence, each CAFO was not counted one time. It could be counted multiple times depending on how many blocks it was within three miles from.

Marianne Engelman Lado: In other words, this is Marianne Engelman Lado again, Dr. Johnston, if there was a CAFO that straddled that three mile radius or was in one radius and then another radius, how would you handle it?

Jill Johnston: Yes. So our unit of analysis is the census block. And so for each census block sort of independent of all the other ones, we would draw the three mile radius and count up every CAFO that fell within the three miles. And then we would go to the next, you know, the adjacent block to it. Draw a circle and count up every CAFO within three miles of that block. And so, so the sum of the steady state live weight, could be counted, you know, if not, we didn't assign each CAFO only to one block. We assigned each block to the nearby CAFOs. Does that help explain it?

Marianne Engelman Lado: I think so.

Mary O'Lone: Well, so then the next, I guess my next question is when you look at the people. So the latitude and longitude has to be within third, three mile circle. And then when you count the people, how are you doing that?

Jill Johnston: So the people aren't counted more than once. We, we include the population of each census block. So, all the – there's a hundred people living in the census block, they're all assigned the same study state live weight based on what the three mile radius.

Mary O'Lone: OK. OK.

Jill Johnston: So people are not counted more than once in the model.

Mary O'Lone: OK. I get it. Anybody else have any question about study state live weight? All right. OK, the next question was about you know, asking you about the update. Did the update happen but we know that it did. So, we will skip that one and come back to it at a later date probably.

Jill Johnston: OK.

Mary O'Lone: So on page 4, you describe how race and ethnicity was categorized. But then when we looked at the complaint, we went – and we looked at page – where is that? 106. 106. OK, on page – I don't know what – 35 of the complaint. It also talks about the characterization in particular of African-Americans. And the description seemed, seemed inconsistent to us. And it had to do with people who could identify themselves as black and Hispanic. And so, we were wondering if, if these two – if the statement about it on page 4 of the 2014 report and footnote 106 on page 35 of the complaint, whether they were inconsistent or weren't inconsistent or you know, like how we should be interpreting this.

Jill Johnston: I mean, so I can describe the definition we used in the report and then maybe Marianne can talk about the footnote. But we used for of one the census categories. And so, our definition of black was anyone who identified it – identified themselves as African-Americans are black with or without any other race or ethnicity. So if they identified as black and Hispanic, it would be categorized in this black group. So that's how we did it for the purposes of this –

Mary O'Lone: Ok.

Marianne Engelman Lado: I'm sorry Dr. Johnston in – on page four it says black is people who identify themselves as African American or Black with or without any other race. Is that right? I thought just heard only without – with.

Jill Johnston: Yes.

Marianne Engelman Lado: I'm sorry without.

Jill Johnston: No, I'm sorry if I said that I misstated. No, I meant – yes, how it's written here is correct. So it's –

Marianne Engelman Lado: And then footnote 106 says the term African American herein corresponds black as used in the report it – the black racial category referred to those who identified as African American – that's probably a typo. It should be with or without.

Mary O'Lone: OK, all right.

Johanna Johnson: Hi this is Johanna Johnson. I just one quick follow up question. And that's with regards to individuals who identify themselves as Black Hispanic. You indicated they will be categorized in the black category. But would they also appear in the Hispanic category as well?

Jill Johnston: Yes, So I would note one of the (inaudible) these terms but the definitions of Black, Hispanic and America Indian. We do not use mutually exclusive terms or mutually exclusive categories. So people when we do the race specific analyses they could be counted with more than one race based on what they identified on their census forms.

Mary O'Lone: OK, any other –

Jill Johnston: But the category of non-Hispanic white and people of color. Those two are mutually exclusive. So there's no one that overlap, you know, which is what we use for our primary analysis.

Mary O'Lone: Right. Anything else?

Johanna Johnson: No.

Mary O'Lone: OK. Now what we'd like to do and Marianne maybe you can help in the updates that was sent. You know is it just the numbers that have changed? Well let me explain what I'm going to do here. What we wanted to do was walk through in a study. Each of the tables – each of the figures and tables to make sure we understand what they say and then

we wanted to look at them – look at how they're characterized in the complaint because one of the things that we have to do as we discussed it internally is be able to communicate in layman's terms how these – what these findings are. So we want to make sure that we understand it and we can see that, you know, the complaint takes, you know, writes up something. And so we wanted to see – we wanted to make sure that, you know, what was in the study or I mean what was within the complaint could, you know, use that as our layman's discussions. So we wanted to cross walk these things but also go through them and make sure that we actually understand, you know, what the study itself is saying. OK?

Marianne Engelman Lado: Yes, let me give some context and I don't know if this will be helpful or not but let's try. First of all Elizabeth reminded me and we will double check. When we filled the complaint we probably sent a copy to then DENR now DEQ.

Unknown Female Speaker: I think that's right.

Marianne Engelman Lado: There were some confidential documents in there. So we didn't send the whole thing. And we'll have to go back and check our records and let you know what we sent and what we didn't. I don't see any reason – I mean this was not a confidential document. But I just don't remember. So and I'm not sitting in front of the, you know, my computer where I can pull up exactly what was sent to DEQ. So, so we'll do that and we'll get back to you on that. In terms of the difference let me tell you our thinking and methodology as complainants. And then Dr. Johnston can say a little bit about what might have been different, if you remember Dr. Johnston. So we obviously wanted to get, even though the 180 day requirement is waivable we wanted to get a complete set of allegations into OCR within 180 days. So we wanted to do it—submit a disproportionality analysis that was rigorous within that 180 day timeline. The challenge is at the 180 day timeline, the data – I think it wasn't even up on the Website for DEQ then DENR. But if it was, not with sufficient notice to be able to ask Dr. Wing and Dr. Johnston to do an analysis. So talking to – knowing that there wasn't going to be that much difference in the location of these facilities for technical reasons which you may be aware of that any new facility in the State of North Carolina have to use new technologies. And it's only pre-existing facilities that haven't expanded that are under the state the general permit. So while some facilities may drop out of the list there are not going to be any new facilities on the list. And there's kind of disincentive to drop out. So we knew there wouldn't be that much change. So we did ask Dr. Wing and Dr. Johnston if it made sense to do the disparities analysis first on the list that existed at the time right before we filed the complaint which is what they did with the – and then and they could refine their methodology by doing that building on the work that they had previously done on disproportionality.

And then once – once we had the list and I should say and Dr. Johnston you can talk more about this, there was a lot of work that went into that. There was a lot of clean up of the data. The – the geographic locations often weren't right. There was just a lot of work that went into working with that list. And then they were able to provide the 2014 disproportionality analysis. But with the full intent that once we had the – the list of facilities that had been approved for operation under the challenge firm and are under the new permit they would then conduct the same analysis.

But I say the same kind of in quotes because if there were any – any lessons learned or any tweaks that the new data provided that they would – they were free to kind of have the best analysis possible. So, you know, again Dr. Johnston can refresh my memory to precisely what tweaks there may have been. But I don't want to state that the only difference is in the results because there was an opportunity to have a fresh look at the methodology – fundamentally the

methodology was similar. But they were able to tweak the way they were doing things in order to do the best study possible.

Jill Johnston: Yes, so the major difference is there were 2,055 CAFOs included in the 2014 analysis. And then for the updated analysis based on the permit list there were 2,029. So, you know, that was the major change for facilities that do not undergo permitting or ones that where their permit expired and we do have any evidence that they were going to like renew their permit. What we tried to do in the 2014 analysis was use the best available knowledge we had about which – which CAFOs to include. So we did get some additional information from the state about which ones were not operational and which ones may have had permits but had zero animals housed there. So we did make some adjustment in this first paper to try to anticipate what would be included under the general permits. But in terms of the methodology the analysis and the tables provided are the same. We changed the figures a little bit to try to make them look nicer and we also – there were 20 western counties excluded and that was using the same criteria as we did before. But there was just one additional county that met these criteria.

Mary O'Lone: OK. Yes, OK. Well that was a good explanation. So can we now turn to the – we're going to work from the 2014 (inaudible) you know what we have in front of us. And maybe when you made the changes some of our questions will be answered. But I just – I wanted to start on page 11 just with figure 1. And I have no questions about that. Now I'm moving on to figure 2.

Jill Johnston: OK.

Mary O'Lone: OK. It says the percent of population living within three miles of an IHO in relation to the percent of people of color. Is that the percent of the population in the green study area or the –

Jill Johnston: Yes, so all of the data and all the table and figures provided here are from the study area.

Mary O'Lone: So figure 3. So in the complaint figure 3 is described on page 35 in paragraph 133. I should (inaudible). And I guess the – what we're asking you Dr. Johnston is well I guess do you agree with, that this statements states what your study shows and what that figure shows I guess?

Jill Johnston: Can you read the statement please?

Mary O'Lone: You don't have it? I'm sorry.

Jill Johnston: No, I don't have it, sorry.

Mary O'Lone: It says as shown in the following figure which depicts the relationship of industrial swine facilities to the racial and ethnic composition of North Carolina, swine facilities are clustered in communities of color.

Jill Johnston: Yes, I would agree with that statement.

Mary O'Lone: OK – flipping.

Jill Johnston: And now just to note this becomes figure 2 actually in the updated report. And here we kind of just have three categories of people of color. Anyway it's displayed more closely than how we conduct the analysis in the updated report.

Mary O'Lone: What do you mean? I'm not sure I understand what you mean.

Jill Johnston: (inaudible) – so we actually had like six – six categories that we assign census blocks into six racial categories. And on this map but as original figure in order to simplify it we just show three categories under 20 percent, 20 to 40 percent and then above 40 percent.

Mary O'Lone: We – that was actually a little hard to hear. Can you say that again?

Jill Johnston: I'm sorry. So on this figure, the figure 3 we show – we just showed three categories just that we simplify for purposes of displaying the information which was less than 20 percent, 20 to 40 percent and greater than 40 percent whereas in the updated figure we show all six categories that we use for our analysis. So it's just a minor point and it doesn't impact my interpretation of it.

Mary O'Lone: OK.

Jill Johnston: But just to note if we were discussing these changes between the two versions. That was one. We just changed how we displayed the information.

Unknown Female Voice: OK. In the updated version it's figure 2 on page 11.

Jill Johnston: Yes.

Mary O'Lone: OK. So now we're moving on to table 2. So table 2 is – table 2 is discussed in a handful of paragraphs in the complaint. So I guess I will just read them to you one at a time. So this is paragraph 132 on page – I don't know what – wait, 13, so it's 13. No. It's not. What am I talking about? 35, paragraph 132 on page 35 of the complaint. And we are talking about table 2 on page 13 of the study. Paragraph 132 says analysis of the population statewide yields consistent result. The proportions of African Americans, Latino's and Native Americans statewide living within three miles of an industrial swine facility are 1.4, 1.26 and 2.3 times higher than the percentage of non-Hispanic Whites respectively which-Table 2- the disparities are also statistically significant. Is that right?

Unknown Female Voice: Yes.

Mary O'Lone: Table 2.

Unknown Female Voice: I would note that refers to both page 6 and table 2 of the report.

Mary O'Lone: What?

Unknown Female Voice: Paragraph 32, 132.

Unknown Female Voice: OK.

Mary O'Lone: That is basically your sort of quoting page 6. Is that what you're saying?

Unknown Female Voice: I believe so.

Jill Johnston: So that statement I think maybe actually doesn't draw on table 2 that we have shown here which is just for the study area. I think – I believe those numbers that you've read are for the whole state for a statewide analysis where we don't exclude any areas.

Mary O'Lone: OK. So which table should this or is this about? Where are those results displayed?

Unknown Female Voice: It's the first paragraph on page 6, OK.

Jill Johnston: I am not sure of all the tables from our statewide analysis were included in the documents sent to you.

Mary O'Lone: You mean – OK. So the document dated August 29th, 2014, Industrial Hog Operations in North Carolina, what you're saying is there's results discussed in the text that aren't displayed in the table or a figure.

Jill Johnston: Yes, so all the tables and the figures provided in this document are just for the analysis where we restricted it to the study area as (inaudible) –

Mary O'Lone: OK.

Jill Johnston: But there was a parallel analysis that didn't restrict that like included all census blocks in the State of North Carolina and so these results included in the text on page 6 are from that analysis that uses the entire population.

Unknown Female Voice: OK. OK. Just to draw your attention to paragraphs 131 and 132 of the complaint. 131 says analysis based on the study area that excludes the state five major cities in

western counties. And then goes on to give the numbers. And then paragraph 132 by contrast says analysis of the population statewide yields consistent result.

So paragraph 131 is about the data in the study area and paragraph 132 says it's consistent but here are the numbers for the state – for a statewide run. Is that correct Jill?

Jill Johnston: Yes.

Jeryl Covington: So 131 again is just for the state –

Jill Johnston: OK.

Jeryl Covington: Or Statewide?

Unknown Female Voice: Paragraph 131 says analysis on a study area so it's for the state but only the study area within the state. And that's what the tables reflect. Paragraph 132, the very first sentence says analysis of the population statewide yields consistent results. So that's – those numbers 1.4, 1.26 and 2.39, which are the same numbers that appear at the top of the report on page 6 first paragraph, is the statewide numbers not just the study area.

Mary O'Lone: So the reference to table 2 is not because those numbers come from table 2. But because table 2 – wait. What is it? It's not about...

Unknown Female Voice: I think the reference to table 2 should probably be like see also. It's – you know I think table, I'm sorry, Page 6 is the actual support whereas table 2 – as Dr. Johnston said seems to be only the study area. Is it all state in the original?

Unknown Female Voice: Well it's racial and ethnic composition of (inaudible) census blocks within three miles of an IHO and more than three miles. So it's the study area excluding the western counties.

Unknown Female Voice: (inaudible) western counties.

Unknown Female Voice: Let me (inaudible) –

Mary O'Lone: OK, so I'm sorry. So this paragraph is basically saying that the statewide results are consistent with table – the proportions are consistent with table 2 which is about the study area?

Unknown Female Voice: Right.

Mary O'Lone: Dr. Johnston is that right?

Jill Johnston: Yes, I'm just, Ok, I'm looking, so yes, I opened up the – I found the document. So yes, so 131 is the proportion, matches within table 2 and then 132 is referring to the state wide analysis with no exclusion areas in which that we did not show the table in this report.

Mary O'Lone: OK, great. We're going to go to – I think so paragraph 140 in the complaint I think it's sort of repeat of that. The statewide proportion of African Americans living within three miles of an industrial swine facility – statewide is 1.4 times higher than the proportion of non-Hispanic whites in that site, table 2 and page – table 2 and page 6.

Jill Johnston: Yes, I believe that's the – that's the same pattern where the one above matches that, the table. In this report, that is the study area, and then 140 versus the statewide analysis.

Mary O'Lone: OK, 142. OK, so the next paragraph then is 142. Are we having the same issue here – the same thing going on? African Americans make up a larger portion – proportion of the population living in proximity to industrial swine (inaudible) than the proportion of the population living within three miles away from any facility with disparity.

Jill Johnston: I believe that (inaudible) compares right that the 20 percent of African American compared to 13 percent of non-Hispanic whites that live within three miles of a CAFO.

Unknown Female Voice: I'm sorry were you quoting again from paragraph 132?

Unknown Female Voice: What are you talking about 142?

Unknown Female Voice: 142, OK, thank you.

Jill Johnston: (inaudible). And it doesn't provide the numbers. But I believe the reference seems appropriate.

Mary O'Lone: OK. And the statement is accurate? 142, OK. Now were moving to 148.

Jill Johnston: Yes, that's the same. That's in reference to the statewide analysis.

Mary O'Lone: OK and that's accurate?

Jill Johnston: Yes.

Mary O'Lone: And 150. (inaudible)

Jill Johnston: Yes, I believe that is correct.

Marianne Engelman Lado: OK. So I'm just trying to reach back and – and Dr. Johnston you may remember as well, these reference to table 2, there are different ways of looking at them. And one maybe that we met kind of the report six provides the information, it's more like a see also table 2 with consistent results. But – but the other way of thinking and I remember that there were lots of charts and tables with the numbers. And I think, and again Dr. Johnston you may remember better than I, we may have taken some charts and tables out simply to make it all more presentable because it was kind of too long and too much. And if we did, could this table 2 have referred to statewide analysis? I just don't remember if there was an earlier draft with more tables, but I seem to have some vague recollection and if so that it may just be kind of typo. But again it's also perfectly consistent, you know, that we may have just thought it's also supported by table 2.

Jill Johnston: You are correct that some variation of all these tables included everything from the study area analysis and then a repeat, you know, maybe like, you know, 2A and 2B or something. I don't remember exactly how we laid it out but some type of study area to the whole state analysis. So it could have drawn on that. And maybe the different iterations change. We try to not have quite as many tables.

Mary O'Lone: Well I'm – this is Mary. I'm beginning to think maybe it would be a good idea to send all the tables in because I know that, you know, there were some questions here about numbers and stuff.

Marianne Engelman Lado: So we could certainly look for any tables that we had that included the statewide analysis which is the piece here and because, you know, if we have something. Also, you know, as these tables were being developed Dr. Wing and Dr. Johnson may have gone back to the data and tweaked, you know, and found that there was a mistake that we included NPDES permits or we included something else that had to be cleaned up. So I don't want to send over stuff that isn't correct, isn't final, right? But because – because they worked on this and as I said before there was a lot of work going into refining the data and then refining the methodology. So but what we can look to see if there were – I do have a recollection that we may have had some near final tables that might have included the statewide data. And we just thought it was too much. So if we have that we can certainly send that over and we'll look for that. I'll put a star next to that as a to-do.

Mary O'Lone: All right, thanks and when – just asking. So the tables don't have headers on them. They're descriptive like the ones that are here. So table 1 is –

Marianne Engelman Lado: I'm not sure were looking for a totally free standing table or is Dr. Johnson said it may have been this table with an additional column. And we just thought it was too confusing to have all that information in one column. It's that kind of thing. So – so it would have a header, you know, if it were a near final version. But I just don't – it's a couple of years ago. And by the time the revisions came long it was more like using this 2014 version as a base so some of these questions weren't revisited again. So its two years ago and I'd have to look

back and confer with Dr. Johnson. But I think there may be something that we can send over to you with statewide data.

Jill Johnston: Yes, we may have to format I'm not sure all the information ended up in this final format but there is a version of the data available.

Mary O'Lone: OK, all right. So turning back –

Marianne Engelman Lado: Just to be clear as I read this and Mary you can correct if you're looking for something that I'm not thinking about or Dr. Johnson correct me if I'm wrong about this. But the data is actually in on page 6. It's just that it's not presented in, you know, in table 2 and the references from table 2 and that's a little confusing. So if we can find that so it, I'm happy to do that. But it doesn't --Dr. Johnson does it change any of your conclusions or is there anything different or new about that data?

Jill Johnston: No, I think it's consistent with what we – with the table that we show. And that, you know, the number and the text and what seems to be in this complaint form are correct.

Mary O'Lone: OK. So, you know, we wanted to – I'm looking at the clock it's five after four. But we wanted to, you know, march through sort of these paragraphs to have you, you know, do what you've been doing so far which is that it's saying yes, that's an accurate characterization of this – this table. And then, you know, after that we have a handful of other questions. But I'm wondering if there's an easier way to do this than just doing it on the phone here so that we can move on to the other kinds of – the other questions that we have. Did you -- Dr. Johnson, did you write these paragraphs that are in the complaint or did you – and or did you – did you write them? That's the first question.

Jill Johnston: No, I did not write them.

Mary O'Lone: OK. Did you review them all before they, you know, came to EPA?

Jill Johnston: I reviewed a version of them. I can't say whether it was the final version or not.

Mary O'Lone: Yes, here's what I'm trying to do. Marianne and I think you probably see what I'm trying to do here. I just want to make sure that – that Dr. Johnson, she didn't write it, but she does agree with what it says. And that's all I'm trying to do to make sure that now when we use it, you know, when we – if we were going to, you know, use the languages in here – that we can adopt it just trying to cross that “T” here.

Marianne Engelman Lado: Let me propose this since Dr. Johnson – we didn't know that this was what you're going to do and Dr. Wing also reviewed these paragraphs. And well, you know, we may have six typos after he reviewed it. He definitely reviewed the final version. I – but perhaps since we didn't expect this line of questioning and Dr. Johnson has a copy of the complaint after the phone call either if you can identify which paragraphs you want her to review –

Mary O'Lone: Sure.

Marianne Engelman Lado: And she can look at them and we can follow up. And if there are any points of divergence of course Dr. Johnson should say so on those paragraphs. But why doesn't she have time to review them and she can get back to us.

Mary O'Lone: Yes, I think that's more efficient.

Marianne Engelman Lado: OK. OK, is that OK with you Dr. Johnson?

Jill Johnston: Yes, I can do that.

Marianne Engelman Lado: OK. Which paragraphs is it or do you want to e-mail us?

Mary O'Lone: We're going to e-mail it. Yes. And we'll have to e-mail you the list. OK, the next question is I think we're already gone. It's hasn't been – the study has – now we're moving off

the, you know, this sticky thing and moving into more general questions. So the study hasn't been published. And you're checking Marianne on whether it was provided to DEQ.

Marianne Engelman Lado: Yes.

Mary O'Lone: OK. And I don't think we need to ask the next two. Do you know has this been made public in other way?

Jill Johnston: I believe that it's on Earth Justice Website.

Mary O'Lone: On the Earth Justice Website?

Jill Johnston: Is that correct?

Mary O'Lone: OK, then maybe I will after next question. Are you aware of any of response or criticisms or critiques of the study, you know, that are out there?

Jill Johnston: I am not and Dr. Wing hasn't shared any with me if he has received something.

Mary O'Lone: Marianne have – have you?

Marianne Engelman Lado: I'm thinking. To be – to be as – as complete as I can but I'm racking my brain and I – I don't think I have received any critique or response for the disproportionality analysis.

Mary O'Lone: OK, all right. Well, you know, if you do come across anything, let us know.

OK, now – now I just wanted to talk about the 2000 study. And mainly it's the differences between the 2000 study and the 2014 study. And, you know, sort of why those changes occurred if you know the answer. So, one of the changes was –

Marianne Engelman Lado: I'm sorry before you go in to that, I like you to just hold up the –

Mary O'Lone: Yes.

Marianne Engelman Lado: -- our Website and it look the disproportionality analysis is available through our Website.

Marianne Engelman Lado: Not on our Website? Where?

Unknown Female Voice: North Carolina Policy Watch.

Marianne Engelman Lado: North Carolina Policy Watch.

Unknown Female Voice: OK. Complaint or the study?

Marianne Engelman Lado: The study.

Mary O'Lone: OK, good, OK.

Marianne Engelman Lado: But – OK, then if you heard that the 2014 analysis seems to be available on North Carolina Policy Watch. We – just also so, you know, this is a little bit of an aside from this interview but we have not generally made available the declarations to the press or to other people. We – we in general when we've gotten inquiries we will call the declarant that might have information responsive to an inquiry and ask whether it's OK if we share their declaration, even for people who did not ask to have their information anonymous. I mean it's anonymously and – and as, you know, there was – that – that there was that category as well. But we are, you know, -- we are respectful of people's courage and concerns about retaliation and so we've been very careful not to just throw everything up on the Website. And it doesn't run to the disparities analysis but we haven't just put all the exhibits up on our Website or in any other place. So, that's – that's part of the backdrop as to why I'm not clear to where we sent what.

Mary O'Lone: OK. Did North Carolina Policy Watch just pick this up off of your Website? So, I'm wondering, so you said you haven't received any critiques. I guess I'm wondering or criticisms or, you know, any – anything not off the wall. Could it have gone in to –

Marianne Engelman Lado: North Carolina –

Mary O'Lone: North Carolina Policy Watch.

Elizabeth Haddix: It's a – this is Elizabeth.

Mary O'Lone: Yes.

Elizabeth Haddix: North Carolina Policy Watch picked up the complaint from the Center's website and I'm not recalling any discussion that I had with them. But it would not surprise me at all because they're – they are investigative journalist that they would dig into studies referenced in the complaint and share this with the public. So, in that – since the 2014 study, I mean it was not confidential, it's not surprising that they posted it on their Website.

Unknown Female Voice: And Dr. Wing may have been talking to members of the public and providing copies since it wasn't confidential.

Mary O'Lone: OK.

Elizabeth Haddix: I'm pretty sure that they had also posted the 2000 report a long time – years ago.

Mary O'Lone: Right.

Elizabeth Haddix: So, it – it could be also that they've just been tracking Dr. Wing's work so.

Mary O'Lone: Do you have a relationship with them or they just pick your stuff up and – and they put it up there. Because what I'm wondering is whether they were on the receiving end of anything legitimate as far as the critiques.

Elizabeth Haddix: I do – we do have a relationship with them, a collegial relationship with them so we could find that out if you're interested or.

Mary O'Lone: Yes, we, you know, we're interested – we are interested in it. I mean we're going to look too but we don't know what, you know, if they curate their site or what happened. So, we would be interested if – if they happen to have anything.

Elizabeth Haddix: I'll find out.

Mary O'Lone: OK, sure, great. Thank you. OK, so – so circling back Dr. Johnston to the – to the 2000 study and some of the changes in the methodology from that study to the 2014 study. One of the things that was discussed in the 2000 study had to do with well water. And looking at those that were – you know, somehow including those and now I can't remember because I'm – I'm looking for it now. But that was taken in to account, but that wasn't discussed in the 2014 study.

Jill Johnston: So, my understanding in this report they looked at sort of three different vulnerable populations. One being racial and ethnic minorities, one, do you know looking at people living poverty, and a third looking at people who are relied on well water, but so – the – all the three variables were not included in one model but they were sort of three parallel analyses that looked at the correlation between those different characteristics of the population and proximity to CAFOs.

Mary O'Lone: OK. And the well water component wasn't done in 2014, do you know – is there a lead in –

Jill Johnston: Yes, I mean so specifically we kind of prioritize looking at racial and ethnic disparities in that analysis. And just – just a limited capacity focused specifically on that issue. But also – so the 1990 census included information about people's drinking water sources. But that to my knowledge that is the last census that included that data so if we wanted to look at data in, you know, in the 2020, I 'm sorry in the 2010 census, they did not include questions asking about drinking water.

Mary O'Lone: All right, great, thank you.

Marianne Engelman Lado: It's like this is Marianne if I could just interject, so because this is – this was not a general study for the general public but a study to test whether there was a racial

disparity related to the general permit, the – the request was to examine that question, whether there are disparities on the basis of race and ethnicity. So, you know, there's a difference between doing a study, you know, for the general inquiry of, you know, of vulnerable populations and – and their relationship to CAFOs and looking into the relationship on the basis of race and ethnicity and whether the civil rights law is violated. So, it was really a question as to whether or not there was a disparity that cognizable under the civil rights law that, you know, that Dr. Wing and – and Dr. Johnson generously took up. So, that you know, -- that's a big part of it here.

Mary O'Lone: OK. Yes, I – I understand what you're saying Marianne. OK, the – so the next question it has to do with the distance and we talked about a little bit earlier. And I think that 2000 study did one and two mile buffers and now this one goes to three so can you – can you – and the next one has to do – the next question I have has to do with the measurement. The idea of moving off the buffer zones around the, the block group area to using the centroid. So, I mean maybe it's all related but if you could explain that.

Jill Johnston: Yes, yes so a major difference between the – for the spatial approach that we took in these two different reports is in the 2000 reports they relied on block groups. And so here there was a little over 4,000 block groups included I believe in the study area. And so, with our report we have over 200,000 blocks in our study area. So, the size of the blocks and the size of the block groups are very different especially in rural areas because they sort of (inaudible) to have, you know, similar types of populations in terms of counts in the – in these different census like geographic areas. And so in rural areas the block groups tend to be very big and so – so they were looking at the – the principal analysis in this 2000 report wanted to see if there was any CAFO in the block groups. And then as sort of a sensitivity approach because, you know, you can have a CAFO right in the corner of a block group and so that could impact it's neighboring block groups as well or a proportion of that population. So, as a sensitivity approach they also looked at, sort of one mile around the block group and then two miles around the block group and included, you know, the category of whether or not it was near a CAFO or (inaudible) adjusted based on those parameters. So, in contrast when you look at blocks, I don't remember the exact number but, you know, there's a little over 2,000 CAFOs in the state so if we were just to assign exposure based on whether or not there was a CAFO in the block, you know, that went down to like fewer than a thousand blocks because they're just much smaller. And so for – for this analysis it – when – when you're using blocks as your unit of analysis then – then you need to consider, I mean, we believe it's important to consider, a buffer zone around it because we know how chemicals can travel off-site. And so, you know, using evidence, a lot of papers that have been published since 2000, we sort of relied on a – a three mile buffer for the 2014 report. But that is – I mean the – the spatial scale of the two are just, are just very different and so that's part of these (inaudible) what kind of buffers were considered.

Jeryl Covington: Let – let me ask a question– and this is Jeryl so I'm – I'm understanding that you all looked the block group and you are still considering I guess the travel, the air emissions of H₂S, you all didn't overlay on this one as well to come up with that distance.

Jill Johnston: On the 2000 report?

Jeryl Covington: Yes.

Jill Johnston: So, the choice of the one and two mile buffers I cannot specifically speak to.

Jeryl Covington: OK.

Jill Johnston: As our part – I believe the data presented here in the table don't specifically include the buffer zone but that was used as a sensitivity analysis. So, if we included these buffers or change their definition of exposure with the patterns that we see changed and – and from my understanding of this report, you know, the patterns were – were consistent but I believe the tables show, rely on the definition of that, of block group is exposed if there's a CAFO in that block group.

Jeryl Covington: I'm going to repeat that. So, you're saying the block group is exposed if there is a CAFO in that block group?

Jill Johnston: Yes, that was the primary definition of the analysis from – from my understanding in this 2000 report.

Mary O'Lone: And the one and two mile buffer around the block group, was not that populations were measured one and two miles outside of that block group? For some other reason.

Female: Yes, so it would take – so perhaps there would be no CAFO in a block group.

Mary O'Lone: OK.

Jill Johnston: But if you do a one mile buffer around it there would be a CAFO. So, under that condition you would include that block group as this population is exposed to a CAFO. And – it doesn't specify I assume because it's block group that's using like around the – one mile around the buffer rather one mile from the centroid.

Mary O'Lone: Yes.

Jill Johnston: Because – you know, because block groups are so much bigger so – so you wouldn't get much outside the borders with that definition.

Unknown Female Voice: Dr. Johnston –

Jill Johnston: Yes.

Unknown Female Voice: And so just to – just to make sure I have it and it's clear when you say you would include that CAFO that's in the buffer up to two miles away in exposure that would be in the sensitivity analysis but not in – I don't know what you call it but the core analysis.

Jill Johnston: Yes, that's how, you know, I don't want to say 100 percent because I did not make these tables. But as I read this paper and how I understand the data presented is they're not using the – the buffered definition. They're – they're just using the category of whether or there's any CAFO inside the block group.

Mary O'Lone: OK, OK, anybody else? All right so the next question and Marianne, I think this probably goes back to what you've already said but, why was poverty omitted this time?

Jill Johnston: Yes, I think it goes back to the same point is that we were, you know, looking at – at criteria that were considered under the – the civil rights act.

Mary O'Lone: OK.

Jill Johnston: And – and so, you know, poverty not being one of those classes considered we didn't include it in the analysis.

Mary O'Lone: OK. Are there any other differences that you by chance know about between the 2000 and the 2014?

Jill Johnston: I mean, you know, the – how we assigned which people were exposed were different. Also this analysis includes all commercial CAFOs in the state of North Carolina whereas the 2014 we restricted to those CAFOs that are covered under the general permit. So, it does not include ones under the individual permits or under NPDES.

Unknown Female Voice: Ok.

Unknown Female Voice: Didn't you Dr. Johnston, explain what you mean by how the – how people are assigned. Are you referring to the use of quintiles and can you explain what the significance of that is.

Jill Johnston: Yes, so actually now (inaudible) – you're considered to be exposed to a CAFO if you live in a block group with the CAFO, you know, whereas in our – in our 2014 report, you're considered to be exposed to a CAFO if you're – the centroid of your block is within three miles of a CAFO.

Unknown Female Voice: Right.

Jill Johnston: But, yes, here also the – we – we take a similar approach to using your categorical variables to account for non-linearity in the relationship between, you know, the racial composition and proximity or exposure to CAFOs. But in this 2000 analysis they divide the group so that in each of the prior groups there's an equal number of block groups in it. So, that's how they defined their power point. So, for example like the – what was quintile is (inaudible) to 2.3 percent, the highest quintile is more than 44 percent people of color. Whereas in the updated (inaudible) we used partly just – because we thought it was a little bit more intuitive and easier to understand, we categorized the percent people of color in to equal – like equal percentages. So, our reference group was the zero percent people of color because that was a high percentage of population where they live in blocks with no people of color and then divided it from, you know, more than zero to 20 – 20 to 40 in this group of 20 percent. Because it's – it's a low risk I think easier to communicate rather than having to talk about, you know, this quintile versus that quintile and also because then we're able to look at, you know, these census blocks that are majority people of color.

Unknown Female Voice: So, Dr. Johnston so that the – just a follow up on that. So, that if you used quintile it would have – would you – it would have been difficult to say anything meaningful about the effect of living in a – over 60 percent versus over 80 percent people of color community but using your methodology you could get more granular on that basis? Is that – is that right?

Jill Johnston: Right

Unknown Female Voice: I didn't hear the answer.

Jill Johnston: I'm sorry. Yes, that is correct.

Unknown Female Voice: Ok.

Mary O'Lone: OK. Anybody else have any other questions, comments? OK. So, the 2000 study and – and, you know, maybe you – you may not be able to answer this but are you aware of any criticisms of that study? So, I think that – wasn't that submitted in one of the general permit processes? So, I'm wondering if it got more play in the outside world then if, you know, what reaction there may have been to that that you're aware of or critiques?

Jill Johnston: I mean it was published in Environmental Health Perspectives which is a high quality journal in environmental health and went through a peer review process. But I can't speak to any of critiques of it.

Mary O'Lone: OK. All right, where are we now? I think we're close to wrapping up here. We have a general – one – one last – one question here is the – is the generic one that's – that's all experts get asked and you probably seen it on TV which is the – you know, were you compensated for doing the study.

Jill Johnston: No. No, I was not.

Mary O'Lone: OK. And the other question I have – I heard somebody laughing, were wondering if – if you had worked with Dr. Wing on any other studies related to swine and – and swine farms of North Carolina.

Jill Johnston: Yes, I worked with him and also Dr. Guidry around an analysis of hydrogen sulfide concentrations near middle schools in Eastern North Carolina which was recently published.

Mary O'Lone: OK, that was – I think that is in your CV or was referenced in your CV, is that right?

Jill Johnston: Yes, yes.

Marianne Engelman Lado: And – and I was just going to interject here that that work and – and Dr. Johnson's experience working on studies generally community based participations studies and other work in the community on which she might base opinions about the adverse impact of – of swine (inaudible) could be subject to another interview as we kind of went back and forth on – that wasn't kind of the premise of this interview but –

Mary O'Lone: Right.

Marianne Engelman Lado: But she's generously said that, you know, if – if she knows in advance that she'd be more than happy to talk to you about that body of work and the research associated with it.

Mary O'Lone: OK, that would be great. Did – did the hydrogen sulfide study get submitted with the materials you sent in April Marianne?

Marianne Engelman Lado: Yes, it is the study that is – it was confidential at the time but it has since been published. So, it – it's – it exhibit but it also says it's confidential.

Mary O'Lone: OK, so –

Marianne Engelman Lado: It was pre-publication at that point.

Mary O'Lone: We have a – the – I'm trying to find – do we can – can send us the publication copy just to make it easy?

Marianne Engelman Lado: Yes.

Mary O'Lone: For us the – the published version, that would be great. You have any other questions right now, do you have another one? I don't think so. Is there – is there anything else that – that you wanted to add Dr. Johnston?

Jill Johnston: You don't – no, I don't believe so, I think if you have a chance to review our updated report then I'm happy to answer any questions or if there are any clarifications related to that but it – it I was a pretty parallel structure to what you have, we just refined the- which CAFOs were included in the analysis.

Mary O'Lone: OK, and so, yes, and I'm kind of thinking Marianne since I haven't had a chance to look at it that, you know, how we were going to send you the paragraph that we wanted to do. I have a feeling we're going to have to – we have to fix it because we have to switch it now to the – to the newer study. So, the a newer study – what you submitted Marianne, is it going to include – is it just a new study or do you have a cover letter that it's like the complaint that goes through and, you know, here's the – here's the layman, you know, description of what is in – the support.

Marianne Engelman Lado: So, it's a little bit of a hybrid in the sense that we have the complaint and we're – we're filing additional submissions in support of the allegations in the complaint. We don't amend the complaint and say this goes to paragraph 132, we rather are just submitting additional documentation in support of those allegations. So, there is a – a short cover letter but it's not – it's not lengthy and, you know, doesn't go in to which paragraph that it supports.

Mary O'Lone: OK.

Marianne Engelman Lado: OK, the other thing I was thinking might be useful since we're ending up a little bit early which is good is just to say a little bit more about Dr. Johnston's experienced, you know, and background and expertise on methodological issues and, you know, -- and of courses taught-- or research done or you have her CV and I think Jeryl Covington asked some questions earlier on but if you have any questions about that -- or I would just open up to Dr. Johnston to say a few more words about whether you have taken any courses or have any special training or expertise on methodology in epidemiology and public health.

Jill Johnston: Sure. I mean I guess the starting point is, you know, that's -- this was not submitted to the peer review process but there's a recent publication that -- that I authored in the American Journal of Public Health. That -- that sort of uses are very similar approach to a racial disparities analysis. It's around a different topic looking at waste water disposal wells in -- in South Texas so not related to industrial animal operations. But, you know, went through the peer review process used block level data and -- and a very similar approach to that. So, there is some, you know, some of -- some of that sort of expertise and -- and credentials in the peer reviewed literature that -- that is similar methods to what we're doing here in this paper. You know, but also, yes I mean I do have fairly expensive course work and the -- these different types of -- of progression modeling, epidemiological study design and also just quantitative data analysis, processes like both in, you know, in biostatistics and epidemiology and then also in the econometrics. And -- and then, you know, I had a two year post-doctoral fellowship in environmental epidemiology and -- and co-taught a class with Dr. Wing specifically on community based epidemiological methods and environmental justice.

Mary O'Lone: OK, well thank you actually that was helpful particularly to the reference to the West Texas or the -- the --

Jill Johnston: Yes, so that article I mean I can send it to you but it's also included in my CV and, yes, may be helpful I -- I think (inaudible) critiques on -- on the -- from the oil industry but nothing that -- that was really methodological driven but -- but yes that can -- it's -- it's a reference in the peer reviewed literature that's -- that takes a very similar approach to -- to how to analyze data in a racial disparities analysis as this one does.

Mary O'Lone: OK, is it -- is it easy for you to send us that report too? Because that -- that --

Jill Johnston: Yes.

Mary O'Lone: -- I think that would be helpful and then --

Jill Johnston: Then maybe I could send it to Marianne and then -- and in her package she can share with you.

Marianne Engelman Lado: Yes.

Mary O'Lone: Great. And the -- the oil and gas industry comments or response or whatever you want to call it. How -- like what form did that take?

Jill Johnston: It came out to a reporter that shared it to me -- with me.

Mary O'Lone: Can -- would you be willing to share that as well?

Jill Johnston: Yes, let me -- let me review it but probably --

Mary O'Lone: OK. OK, did anybody else have any questions at this point? OK.

Marianne Engelman Lado: So, we -- we have some follow up, we have some things to give you, we'll wait for your list of paragraphs as well and exchange information and then it sounds like on -- on the -- the follow up report that was submitted this year as well as the more recent study, as well as other studies and work on the adverse impacts, we should schedule another

interview time. And we can try to do that relatively quickly I think if – if you'd like so let's try to get that all under way.

Mary O'Lone: Yes, I think we'll have to – to get back to you on that.

Jeryl Covington: Yes, yes Marianne what I – what I have identified so far is that you will be sending after you review the background, the statewide study so that we can correlate the tables and the statewide data that you have in the – in the report. We will follow up on whether that questions for the paragraphs are relevant. We need to review the data that you just sent to us on April 12, 2016 to see if those questions have been answered. So, we'll have to review that e-mail and I did receive those e-mail submission. So, let us look at that and then we'll probably coordinate amongst ourselves on the follow up interview with Dr. Johnston and yourself.

Marianne Engelman Lado: Sure (inaudible) if you could send me some dates. I – I think what we said on the statewide data is if there are final charts again, I think it's just a reference problem in the complaint to this table 2–

Jeryl Covington: Yes.

Marianne Engelman Lado: If there was another table 2 with the state wide data or another table with the state wide data or another column in an earlier draft that, you know, sufficiently well along, we'd be happy to send it to you.

Jeryl Covington: OK.

Marianne Engelman Lado: But we will – we'll look for that and get back to you on that.

Jeryl Covington: OK. And then – the follow up we did receive in the April 12 submission the Guidry report that is marked confidential and I think you're going to submit that after publication without the confidential reference to it.

Marianne Engelman Lado: Correct.

Jeryl Covington: And then Dr. Johnston is going to do the supplementary information on the oil and gas disparity analysis literature to you and then you'll subsequently submit that to us.

Unknown Female Voice: So, I think it would be the publication as well as she's going to review the feedback she got to see if it's appropriate to forward.

Unknown Female Voice: Right.

Jeryl Covington: Right. OK.

Marianne Engelman Lado: Terrific. OK, OK. Thank you.

Mary O'Lone: Yes, I think that's it for now.

Unknown Female Voice: OK.

Marianne Engelman Lado: OK.

Mary O'Lone: All right thank you very much and thank you Dr. Johnston.

Jill Johnston: All right thank you.

Mary O'Lone: OK, bye-bye.

Operator: The leader has disconnected, the conference will now end.

END

**Title VI and NC DEQ Swine CAFOs (REACH) Case
October 17, 2016**

ATTACHMENT C

Studies and reports submitted as exhibits to or cited in the Complaint; cited in the disparate impact analysis submitted as an exhibit to the Complaint; or cited Earthjustice 2013 comments on draft Swine Permit.

“*” indicates apparent NC focus.

* Wing, Steve & Johnston, Jill, Dep’t of Epidemiology, Univ. of N.C. at Chapel Hill, *Industrial Hog Operations in North Carolina Disproportionately Impact People of Color* (2014) (**Exhibit 4**)

* Wing, Steve & Johnston, Jill, Dep’t of Epidemiology, Univ. of N.C. at Chapel Hill, *Industrial Hog Operations in North Carolina Disproportionately Impact People of Color* (2015) (**update of Exhibit 4**)

*Wing, Steve et al., *Environmental Injustice in North Carolina’s Hog Industry*, 108 *Envtl. Health Perspectives* 225, 228 (2000), (**Exhibit 52**). (finding that North Carolina’s intensive hog confinement operations are located disproportionately in communities with higher levels of poverty, higher proportions of non-white persons, and higher dependence on wells for household water supply).

* Edwards, B. & Ladd, AE, *Race, Poverty, Political Capacity and the Spatial Distribution of Swine Waste in North Carolina, 1982–1997*, 9 *North Carolina Geogr* 55–77 (2001).

* Stretesky, Paul B. et al., *Environmental Inequity: An Analysis of Large-Scale Hog Operations in 17 States, 1982-1997*, 68 *Rural Soc.* 231 (2003) (finding that between 1982 and 1997 large-scale hog operations in North Carolina were more likely to be sited in areas with a disproportionate number of black residents).

Odors

*Wing S, Horton RA, Marshall SW, Thu K, Tajik M, Schinasi L, et al. 2008. *Air Pollution and Odor in Communities Near Industrial Swine Operations*. *Environ. Health Perspect.* 116:1362-1368. (For approximately 2 weeks, 101 nonsmoking adult volunteers living near industrial swine operations in 16 neighborhoods in eastern North Carolina sat outdoors for 10 min twice daily at preselected times. Participants reported 1,655 episodes of swine odor. In nine neighborhoods, odor was reported on more than half of study-days. The study indicates malodor from swine operations is commonly present in these communities and that the odors reported by neighbors are related to objective environmental measurements and interruption of activities of daily life.)

* Schiffman Susan S. et al., *Quantification of Odors and Odorants from Swine Operations in North Carolina*, 108 Agric. & Forest Meteorology 213 (2001). (neighbors of confinement facilities experienced increased levels of mood disorders including anxiety, depression, and sleep disturbances attributable to exposures to malodorous compounds.)

*Avery, Rachel Horton et al., *Malodor as a Trigger of Stress and Negative Mood in Neighbors of Industrial Hog Operations*, 99 Am. J. Pub. Health Suppl., S610 (2009). (Hog odor, hydrogen sulfide, and semivolatile PM₁₀ are related to stress and negative mood in disproportionately low-income communities near industrial hog operations in eastern North Carolina. Malodor should be considered in studies of health impacts of environmental injustice.)

*Schiffman SS, Sattely Miller EA, Suggs MS, Graham BG. 1995. *The Effect of Environmental Odors Emanating from Commercial Swine Operations on the Mood of Nearby Residents*. Brain Research Bulletin 17:369-375. (neighbors of confinement facilities experienced increased levels of mood disorders including anxiety, depression, and sleep disturbances attributable to exposures to malodorous compounds.)

*Tajik M, Muhammad N, Lowman A, Thu K, Wing S, Grant G. 2008. *Impact of Odor from Industrial Hog Operations on Daily Living Activities*. New Solutions 18:193-205. (75 participants in eastern North Carolina in 2002 and again in 2004 and 2005. Indicates that hog odor limits several leisure time activities and social interactions which could have adverse public health consequences.)

* Avery, Rachel et al., *Odor from Industrial Hog Farming Operations and Mucosal Immune Function in Neighbors*, 59(2) Archives of Env'tl. Health 101 (2004) (finding that swine odor was associated with reduced mucosal immune function among 15 adults living near industrial swine operations in North Carolina).

Air

* Deerhake, Marion et al., *Atmospheric Dispersion and Deposition of Ammonia Gas*, in RTI Int'l, Benefits of Adopting Environmentally Superior Swine Waste Management Technologies in North Carolina: An Environmental and Economic Assessment, at 2-32 to 2-34 (2003), available at http://www.cals.ncsu.edu/waste_mgt/smithfield_projects/phase1report04/appendix%20c-RTI.pdf, (**Exhibit 47**) (modeling rates of ammonia deposition by county). "The greatest deposition occurs in Sampson and Duplin counties." *Id.* at 2-33.

* Mirabelli, Maria C. et al., *Asthma Symptoms Among Adolescents Who Attend Public Schools That Are Located Near Confined Swine Feeding Operations*, 118 Pediatrics e66 (2006) (**Exhibit 42**) (finding students aged 12 to 14 who attended North Carolina public schools within 3 miles of industrial swine facilities reported increased asthma-related symptoms, more doctor-diagnosed asthma, and more asthma-related medical visits compared to peers at other schools).

* Mirabelli, Maria C. et al., *Race, Poverty, and Potential Exposure of Middle-School Students to Air Emissions from Confined Swine Feeding Operations*, 114 *Envtl. Health Perspectives* 591, 595 (2006) (**Exhibit 43**) (finding that North Carolina's swine facilities are located closer to schools enrolling higher percentages of non-white and economically disadvantaged students).

* Schinasi, Leah et al., *Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations*, 22 *Epidemiology* 208, 208 (2011), (**Exhibit 48**) (measuring pollutants levels and effect on 101 adults living near hog CAFOs in 16 eastern North Carolina communities).

* Sacoby, M. Wilson & Serre, Marc L., *Examination of Atmospheric Ammonia Levels Near Hog CAFOs, Homes, and Schools in Eastern North Carolina*, 41 *Atmospheric Env't* 4977, 4985 (2007), (**Exhibit 49**). (NH₃ weekly average concentrations that were collected using passive diffusion tubes from October 2003 to May 2004 (20 sites) and from July 2004 to October 2004 (23 sites) near community locations in close proximity to hog CAFOs. The results indicate potential zones of exposure for human populations who live or go to school near hog CAFOs.)

* Steve Wing et al., *Air Pollution and Odor in Communities near Industrial Swine Operations*, 116 *Envtl. Health Perspectives* 1362 (2008), (**Exhibit 50**) (study participants living within 1.5 miles of swine factory farm reported altering or ceasing normal daily activities when hydrogen sulfide concentrations, and associated hog odor, were the highest).

* Wing, Steve et al., *Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents*, 121 *Envtl. Health Perspectives* 92 (2013) (**Exhibit 51**). (Like noise and other repetitive environmental stressors, malodors may be associated with acute blood pressure increases that could contribute to development of chronic hypertension.)

Vanotti, Matias B. & Patrick G. Hunt, *Ammonia Removal from Swine Wastewater Using Immobilized Nitrifiers*, in *Proceedings of the 8th Int'l. Conf. of the FAO ESCORENA Network on Recycling of Agricultural, Municipal and Industrial Residues in Agriculture*, Rennes, France 427, 428 (1998), available at <http://www.ramiran.net/doc98/FIN-ORAL/VANOTTI.pdf>.

Zahn, James A. et al., *Air Pollution from Swine Production Facilities Differing in Waste Management Practice* 3, *Proceedings of the Odors and Emission 2000 Conference* (2000) (listing all types of "emissions released from stored swine manure" mentioned above).

Merchant, James A. et al., *Asthma and Farm Exposures in a Cohort of Rural Iowa Children*, 113 *Envtl. Health Perspectives* 350 (2005) (finding children living on swine farms, including large facilities with more than 500 head, experienced increased rates of asthma compared to non-exposed children; results more pronounced where swine facilities added antibiotics to feed).

Radon, Katja et al., *Environmental Exposure to Confined Animal Feeding Operations and Respiratory Health of Neighboring Residents*, 18 *Epidemiology* 300 (2007) (surveying nearly

7,000 residents of four German towns with high confined livestock operation densities and concluding that such operations “may contribute to the burden of respiratory disease among their neighbors”). (Footnoted in Earthjustice comments on draft permit).

* Walker, John T. et al., *Atmospheric Transport and Wet Deposition of Ammonium in North Carolina*, 34 *Atmospheric Env't* 3,407 (2000). (NH₃ emissions from this source region, primarily evolving from swine and poultry operations, are found to increase NH₄⁺ concentration in precipitation at sites up to ≈80 km away. At the Scotland County (NC36) and Wake County (NC41) sites, mean NH₄⁺ concentrations show increases of at least 44% for weeks during which 25% or more back trajectories are influenced by this source region.)

*Costanza, Jennifer K et al., *Potential Geographic Distribution of Atmospheric Nitrogen Deposition from Intensive Livestock Production in North Carolina, USA*, 398 *Sci. Total Env't* 76, 77 (2008).

* Schiffman, Susan S. et al., *Symptomatic Effects of Exposure to Diluted Air Sampled from a Swine Confinement Atmosphere on Healthy Human Subjects*, 113 *Envtl. Health Perspectives* 567 (2005) (finding that those exposed to diluted swine air for two 1-hour sessions were more likely to report headaches, eye irritation, and nausea than the control group that was exposed to clean air); <http://www.ncbi.nlm.nih.gov/pubmed/15866765>. (Aerial emissions from a swine house at North Carolina State University's field laboratory were diluted to a level that could occur at varying distances downwind from a confined animal feeding operation (CAFO) both within and beyond the property line, and these emissions were delivered to an environmental exposure chamber.)

*Sacoby, M. Wilson & Serre, Marc L. *Use of Passive Samplers to Measure Atmospheric Ammonia Levels in a High-density Industrial Hog Farm Area of Eastern North Carolina*, 41 *Atmospheric Env't* 6,074 (2007). (October 2003 to May 2004 (20 sites) and from July 2004 to October 2004 (23 sites) at varying distances from hog CAFOs in close proximity to homes and schools. Average weekly NH₃ levels were measured. Mean level of 13.8 ppb near homes and schools (<2 km) was 4–12 times greater than ambient background levels (1–3 ppb), reaching as high as 80 ppb. Exposed sites (<2 km from a hog CAFO) had a mean level of 12.8 ppb which was over 2 times higher than the mean level of 5.5 ppb at less exposed sites (>2 km from a hog CAFO).)

Donham K. 1993. *Respiratory Disease Hazards to Workers in Livestock and Poultry Confinement Structures*. *Seminars in Respiratory Medicine* 14:49-59.

Donham K, Reynolds S, Whitten P, Merchant J, Burmeister L, Pependorf W. 1995. *Respiratory Dysfunction in Swine Production Facility Workers: Dose-response Relationships of Environmental Exposures and Pulmonary Function*. *American Journal of Industrial Medicine* 27:405-418.

Donham K, Cumro D, Reynolds S, Merchant J. 2000. *Dose-Response Relationships Between Occupational Aerosol Exposures and Cross-Shift Declines of Lung Function in Poultry Workers: Recommendations for Exposure Limits*. Journal of Occupational and Environmental Medicine 42:260-269.

Donham, KJ. 1990. *Health Effects from Work in Swine Confinement Buildings*. American Journal of Industrial Medicine 17:17-25.

Water

* Anderson, M.E. & Sobsey, M.D. *Detection and Occurrence of Antimicrobially Resistant E. coli in Groundwater on or near Swine Farms in Eastern North Carolina*, 54 Water Sci. & Tech. 211, 217 (2006), (**Exhibit 37**) (“Overall, the results of this study demonstrated that antibiotic-resistant E. coli were present in ground waters associated with commercial swine farms that have anaerobic lagoons and land application systems for swine waste management.”).

*Wendee, Nicole, *CAFOs and Environmental Justice: The Case of North Carolina*, 121 Env'tl. Health Perspectives A182, A186 (2013), (**Exhibit 44**) (“Even without spills, ammonia and nitrates may seep into groundwater, especially in the coastal plain where the water table is near the surface.”).

* Burkholder, JoAnn M. et al., *Impacts of Waste from CAFOs on Water Quality*, 115 Env'tl. Health Perspectives 308, 309 (2007) (**Exhibit 3 to Burkholder Declaration**). (article is part of the mini-monograph “Environmental Health Impacts of Concentrated Animal Feeding Operations: Anticipating Hazards—Searching for Solutions.”)

* Mallin, Michael A. et al., Ctr. for Marine Science Research, Univ. of N.C. at Wilmington, *Effect of Organic and Inorganic Nutrient Loading on Photosynthetic and Heterotrophic Plankton Communities in Blackwater Rivers* (1998), *available at* <http://repository.lib.ncsu.edu/dr/bitstream/1840.4/1880/1/NC-WRRI-315.pdf>;

Hodne, Carol J., Iowa Policy Project, *Concentrating on Clean Water: The Challenge of Concentrated Animal Feeding Operations* 8 (2005), *available at* <http://www.iowapolicyproject.org/2005docs/050406-cafo-fullx.pdf>. 2005docs/050406-cafo-fullx.pdf (identifying “seepage from earthen manure storage structures” as typical pathway for nitrates entering groundwater).

* Burkholder, JoAnn M. & Glasgow, Howard B. *History of Toxic Pfiesteria in North Carolina Estuaries from 1991 to the Present*, 51 Biosci. 827, 833 (2001) (“During acute [Pfiesteria] exposure, fish commonly hemorrhage or develop skin lesions that are diffuse or nonfocal, as well as deep, localized or focal, bleeding sores or ulcerations.”).

* Mallin, Michael A. et al., *Factors Contributing to Hypoxia in Rivers, Lakes, and Streams*, 51 Limnology & Oceanography 690, 699-700 (2006). (Investigated physical, chemical, and biological variables contributing to biochemical oxygen demand (BOD))

in 17 North Carolina lotic and lentic water bodies affected by mild to severe hypoxia.)

* Wing, Steve et al., *The Potential Impact of Flooding on Confined Animal Feeding Operations in Eastern North Carolina*, 110 *Envtl. Health Perspectives* 387, 387 (2002), available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240801/pdf/ehp0110-000387.pdf> (describing how the 15-20 inches of rain dropped by Hurricane Floyd turned eastern North Carolina into a fecal flood zone). The flooding following Hurricane Floyd was not an isolated incident. *Id.* ("In 1996, 22 fecal waste pits were reported to have been ruptured or inundated following flooding from Hurricane Fran, and one major spill was reported following Hurricane Bonnie in 1998.").

* Casteel et al., "Fecal Contamination of Agricultural Soils Before And After Hurricane-Associated Flooding In North Carolina," *J Environ Sci Health A Tox Hazard Subst Environ Eng* 41, no.2 (2006).

Ham, J.M. & Baum, K.A. *Measuring Seepage from Waste Lagoons and Earthen Basins with an Overnight Water Balance Test*, 52 *Am. Soc'y of Agric. And Biological Engineers* 835 (2009) (introducing test capable of producing accurate seepage measurements in single overnight performance).

Ham, J.M. *Seepage losses from animal waste lagoons: A summary of a four year investigation in Kansas*, 45 *Am. Soc'y of Agric. Eng'rs* 983 (2002) (summarizing study performed using earlier variation of water balance method).

Antibiotic Resistance

Casey, Joan A. *High-Density Livestock Operations, Crop Field Application of Manure, and Risk of Community-Associated Methicillin-Resistant Staphylococcus aureus Infection in Pennsylvania*, 173 *J. Am. Med Ass'n: Internal Med.* 1980 (2013).

Ctrs. for Disease Control, U.S. Dep't of Health and Human Servs., *Antibiotic Resistance Threats in the United States, 2013*, at 6 (2013), available at <http://www.cdc.gov/drugresistance/threat-report-2013/pdf/ar-threats-2013-508.pdf>.

Denis, Oliver et al., *Methicillin-Resistant Staphylococcus aureus ST398 in Swine Farm Personnel, Belgium*, 15 *Emerging Infectious Diseases* 1098 (2009) (Belgium).

Huijsdens, Xander W. et al., *Community-Acquired MRSA and Pig-Farming*, 5 *Annals Clinical Microbiol. & Antimicrobials* 26 (2006) (Netherlands).

Khanna, T. et al., *Methicillin Resistant Staphylococcus aureus Colonization in Pigs and Pig Farmers*, 128 *J. Veterinary Microbiol.* 298 (2008) (Canada).

* Rinsky JL, Nadimpalli M, Wing S, Hall D, Baron D, Price LB, et al. 2013. *Livestock-Associated Methicillin and Multidrug Resistant Staphylococcus Aureus Is Present Among*

Industrial, Not Antibiotic-Free Livestock Operation Workers in North Carolina. PLoS One 8:e67641.

Schulz, Jochen et al., *Longitudinal Study of the Contamination of Air and of Soil Surfaces in the Vicinity of Pig Barns by Livestock-Associated Methicillin-Resistant Staphylococcus aureus*, 78 Applied Environ. Microbiol. 5666 (2012) (detecting MRSA 300 feet from a barn in which animals, air, and workers' plastic boots tested positive for MRSA).

Silbergeld, EK & Price LB, *Industrial Food Animal Production, Antimicrobial Resistance, and Human Health*, 29 Ann. Rev. of Pub. Health 151 (2008).

Silbergeld, E.K., et al., *One Reservoir: Redefining the Community Origins of Antimicrobial-Resistant Infections*, Med Clin North Am 92, no. 6 (2008).

Smith, Tara C., et al., *Methicillin-Resistant Staphylococcus aureus (MRSA) Strain ST398 Is Present in Midwestern U.S. Swine and Swine Workers*, 4 PLoS One e4258 (2009).

Smith, Tara C., et al., *Methicillin-Resistant Staphylococcus aureus in Pigs and Farm Workers on Conventional and Antibiotic-Free Swine Farms in the USA*, 8 PLoS One e63704 (2013).

Van den Broek, Ingrid V.F. et al., *Methicillin-Resistant Staphylococcus aureus in People Living and Working in Pig Farms*, 137 J. Epidemiol. & Infection 700 (2009) (Netherlands).

West, Bridgett M., et al., *Antibiotic Resistance, Gene Transfer, and Water Quality Patterns Observed in Waterways Near CAFO Farms and Wastewater Treatment Facilities*, 217 Water Air Soil Pollution 473 (2011).

Barrett, Julia R., *Airborne Bacteria in CAFOs: Transfer of Resistance from Animals to Humans*, 113 Environ. Health Perspectives A116 (2005) (reviewing literature on cross-species transfer of antibiotic-resistant bacteria).

Chapin, Amy, et al., *Airborne Multidrug-Resistant Bacteria Isolated from a Concentrated Swine Feeding Operation*, 113 Environ. Health Perspectives 137 (2005) (finding multidrug-resistant *Enterococcus*, coagulase-negative staphylococci, and viridans group streptococci in the air of an industrial swine operation at levels dangerous to human health).

Gibbs, Shawn G. et al., *Isolation of Antibiotic-Resistant Bacteria from the Air Plume Downwind of a Swine Confined or Concentrated Animal Feeding Operation*, 114 Environ. Health Perspectives 1032 (2006).

Gibbs, Shawn G. et al., *Airborne Antibiotic Resistant and Nonresistant Bacteria and Fungi Recovered from Two Swine Herd Confined Animal Feeding Operations*, 1 J. Occupational & Environ. Hygiene 699 (2004) (finding multidrug-resistant bacteria inside and downwind of

industrial swine operations at levels previously determined to pose a human health hazard). (midwest CAFOs)

Casey JA, Curriero FC, Cosgrove SE, Nachman KE, Schwartz BS. 2013. *High-Density Livestock Operations, Crop Field Application of Manure, and Risk of Community-Associated Methicillin-Resistant Staphylococcus Aureus Infection in Pennsylvania*. JAMA Internal Medicine 173:1980-1990.

*Cole, D, Drum DJ, Stalknecht DE, White DG, Lee MD, Ayers S, et al. 2005. *Free-living Canada Geese and Antimicrobial Resistance*. Emerging Infectious Diseases 11:935-938. (Describes antimicrobial resistance among *Escherichia coli* isolated from free-living Canada Geese in Georgia and North Carolina (USA). Resistance patterns are compared to those reported by the National Antimicrobial Resistance Monitoring System. Canada Geese may be vectors of antimicrobial resistance and resistance genes in agricultural environments.)

Graham JP, Price LB, Evans SL, Graczyk TK, Silbergeld EK. 2009. *Antibiotic Resistant Enterococci and Staphylococci Isolated from Flies Collected near Confined Poultry Feeding Operations*. Sci Total Environ 407:2701-10. (Delmarva Peninsula)

*Rinsky JL, Nadimpalli M, Wing S, Hall D, Baron D, Price LB, et al. 2013. *Livestock-Associated Methicillin and Multidrug Resistant Staphylococcus Aureus Is Present Among Industrial, Not Antibiotic-Free Livestock Operation Workers in North Carolina*. PloS One 8:e67641.

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Green CF, Gibbs SG, Tarwater PM, Mota LC, Scarpino PV. 2006. *Bacterial Plume Emanating from the Air Surrounding Swine Confinement Operations*. Journal of Occupational and Environmental Hygiene 3:9-15. (midwest CAFOs)

Property Values

* Kim, Jungik & Goldsmith, Peter, *A Spatial Hedonic Approach to Assess the Impact of Swine Production on Residential Property Values*, 42 Env'tl & Res. Econ. 509 (2009) (estimating decline in Craven County, NC home property values on per hog basis).

* Milla, Katherine, et al., *Evaluating the Effect of Proximity to Hog Farms on Residential Property Values: A GIS-Based Hedonic Model Approach*, 17 URISA J. 27 (2005) (finding that values of Craven County, North Carolina homes decreased with increasing local hog populations and decreasing distances from homes to factory farms).

*Palmquist RB, Roka FM, Vukina T (1997) *Hog Operations, Environmental Effects, and Residential Property Values*. Land Econ 73:114–124 (find that hog operations in North Carolina

cause a reduction in house price up to 9% depending on the number of hogs and their distance from the house. They estimate that the effect of a new hog operation located within one-half mile of a house would decrease the house value by 4.75% if a house is exposed to an intermediate level of manure.)

Herriges JA, Secchi S, Babcock BA, *Living with Hogs in Iowa: The Impact of Livestock Facilities on Rural Residential Property Values*, 81 Land Econ. 530 (2005). (found that a moderate-size livestock operation (250,000 live weight pounds) can cause -26% reduction in property value in Iowa if the property is downwind and ¼ mile away from the facility.)

Surveys/Quality of Life/Public Health Impacts

*Bullers S. *Environmental Stressors, Perceived Control, and Health: The Case of Residents Near Large-Scale Hog Farms in Eastern North Carolina*. Human Ecology 33:1-16. (2005) (physical and psychological health effects of residence near industrial hog farms)

Cole, Dana et al., *Concentrated Swine Feeding Operations and Public Health: A Review of Occupational and Community Health Effects*, 108 Env'tl. Health Perspectives 685 (2000), available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1638284/pdf/envhper00309-0041.pdf>, (**Exhibit 39**).

Thu, K.M., *Public Health Concerns for Neighbors of Large-Scale Swine Production Operations*, 8 J. Agric. Safety & Health 175 (2002) (synthesizing research regarding public health concerns for neighbors of industrial swine facilities, including respiratory issues associated with air pollution).

Hribar, Carrie, Nat'l Ass'n of Local Bds. of Health, *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities*, *Environmental Health* 4 (2010), available at http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf, (**Exhibit 40**).

Pew Commission on Industrial Farm Animal Production, *Environmental Impact of Industrial Farm Animal Production* 1-2 (2008), available at http://www.ncifap.org/_images/212-4_EnvImpact_tc_Final.pdf, (**Exhibit 45**).

Pew Commission on Industrial Farm Animal Production, *Putting Meat on the Table: Industrial Farm Animal Production in America* (2008), available at http://www.ncifap.org/_images/PCIFAPSmry.pdf, (**Exhibit 46**) (describing the rise of industrial animal production in America and the effects on public health and the environment).

Gurian-Sherman, Doug, Union of Concerned Scientists, *CAFOs Uncovered: The Untold Costs of Confined Animal Feeding Operations* (2008), available at http://www.ucsusa.org/assets/documents/food_and_agriculture/cafos-uncovered.pdf (discussing the substantial cost of confined animal feeding operations and discussing alternatives).

Greger, Michael & Koneswaran, Gowri, *The Public Health Impacts of Concentrated Animal Feeding Operations on Local Communities*, 33 Farm Cmty. Health 11, 13 (2010).

Stacy Sneeringer, *Does Animal Feeding Operation Pollution Hurt Public Health? A National Longitudinal Study of Health Externalities Identified by Geographic Shifts in Livestock Production*, 91 Am. J. Agric. Econ. 124, 130 (2009). (Using county-level data spanning two decades. 100,000 animal unit increase in a county corresponds to 123 more deaths of infants under one year per 100,000 births and 100 more deaths of infants under 28 days per 100,000 births. Doubling of production induces a 7.4% increase in infant mortality. Mortality increases are driven by elevated levels of respiratory diseases, providing suggestive evidence of an air pollution mechanism.)

Donham KJ, et al. *Community Health and Socioeconomic Issues Surrounding Concentrated Animal Feeding Operations*. Environ. Health Perspect. 115:317-320 (2007) (survey of literature on effects on physical health, mental health, social health, economic health)

Thu K, Donham K, Ziegenhorn R, Reynolds S, Thorne P, Subramanian P, et al. 1997. *A Control Study of the Physical and Mental Health of Residents Living near a Large-Scale Swine Operation*. Journal of Agricultural Safety and Health 3:13-26.

Thorne, P. S., *Environmental Health Impacts of Concentrated Animal Feeding Operations Anticipating Hazards-Searching for Solutions*, Environ Health Perspect 115, ro.2 (2007). (Describes 5 expert workgroup reports from 2004 scientific conference that outline the state of the science and public health concerns relating to major environmental health issues associated with CAFOs CAFO livestock production including respiratory health effects, modeling and monitoring of air toxics, water quality issues, influenza pandemics and antibiotic resistance, and community health and socioeconomic issues.)

Villeneuve, P. J. et al., *Intensive Hog Farming Operations and Self-Reported Health Among Nearby Rural Residents in Ottawa, Canada*, BMC Public Health 9(2009) (Higher prevalence of depression among those who lived within 3 km of the swine CAFO relative to those who lived more than 9 km away. Individuals who lived closer to the swine CAFO were more likely to worry about environmental issues such as water quality, outdoor and indoor smells, and air pollution which contributed to lower HRQOL scores for individuals who lived closer to swine CAFO. Prevalence of depression was much higher among those who indicated a concern about environmental issues (18.2%) when compared to those who did not (8.0%).)

Rule, A. M., et. al., *Food Animal Transport: A Potential Source of Community Exposures to Health Hazards from Industrial Farming (CAFOs)*, J Infect & Pub Health, 1:33-39, (2008). (Air and surface samples were taken from cars driving behind poultry trucks for 17 miles. Air conditioners and fans were turned off and windows fully opened. Results indicate an increase in the number of total aerobic bacteria including both susceptible and drug-resistant enterococci isolated from air and surface samples, and suggest that food animal transport in open crates

introduces a novel route of exposure to harmful microorganisms and may disseminate these pathogens into the general environment.)

Other

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*Furuset O. *Restructuring of Hog Farming in North Carolina: Explosion and Implosion*. *Professional Geographer* 49:391-403. (1997)

Rotz, C.A., *Management to Reduce Nitrogen Losses in Animal Production*, 82 *J. Animal Sci.* E119, E129 (2004).

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Other studies OCR has located:

Donham KJ1, Lee JA, Thu K, Reynolds SJ., *Assessment Of Air Quality At Neighbor Residences In The Vicinity Of Swine Production Facilities.*, *J Agromedicine*. 2006;11(3-4):15-24. doi: 10.1300/J096v11n03_03. <http://www.ncbi.nlm.nih.gov/pubmed/19274894>

(Air sampling was completed on the front lawn of 35 homes neighboring swine farms in Upper Midwest. In swine CAFO area, exceedences of federal recommended limits for hydrogen sulfide in outdoor air were observed in the swine CAFO area. Concentration of hydrogen sulfide exceeded the recommended limits of the ATSDR (30 ppb) for chronic exposure at two of the 12 homes in the CAFO area (17%). Average hydrogen sulfide concentration exceeded the EPA recommended community standards (0.7 ppb). As chronic exposure to hydrogen sulfide may be present in areas of production agriculture, a potential health risk may be present.)

Thorne PS, Ansley AC, Perry SS. *Concentrations of Bioaerosols, Odors, and Hydrogen Sulfide Inside and Downwind From Two Types of Swine Livestock Operations*. *J Occup Environ Hyg.* 2009 Apr;6(4):211-20. doi: 10.1080/15459620902729184

<http://www.ncbi.nlm.nih.gov/pubmed/19177273> (Inhalable particulate matter, endotoxin, odor threshold, hydrogen sulfide, culturable mesophilic bacteria, culturable fungi, and total airborne microbes, along with wind speed, temperature, and humidity were measured at separate mid-sized livestock facilities (one hoop, one confinement) in Central Iowa on 10 occasions over 2 years. Significant differences in contaminants were observed between hoops and confinement buildings

and across seasons for endotoxin, odors, airborne microorganisms, and hydrogen sulfide. Both types of swine operations produced high airborne concentrations of endotoxin, odor, hydrogen sulfide, bacteria, and fungi. Endotoxin and odors were found downwind at concentrations previously associated with adverse health effects)

*Heaney, Christopher D., et al., *Source Tracking Swine Fecal Waste in Surface Water Proximal To Swine Concentrated Animal Feeding Operations*, Science of the Total Environment 511 (2015) 676-683.

Abstract: For one year, surface water samples at up- and downstream sites proximal to swine CAFO lagoon waste land application sites were tested for fecal indicator bacteria (fecal coliforms, *Escherichia coli* and *Enterococcus*) and candidate swine-specific microbial source-tracking (MST) markers (*Bacteroidales* Pig-1-Bac, Pig-2-Bac, and Pig-Bac-2, and methanogen P23-2). Testing of 187 samples showed high fecal indicator bacteria concentrations at both up- and downstream sites. Overall, 40%, 23%, and 61% of samples exceeded state and federal recreational water quality guidelines for fecal coliforms, *E. coli*, and *Enterococcus*, respectively. Pig-1-Bac and Pig-2-Bac showed the highest specificity to swine fecal wastes and were 2.47 (95% confidence interval [CI] = 1.03, 5.94) and 2.30 times (95% CI = 0.90, 5.88) as prevalent proximal down- than proximal upstream of swine CAFOs, respectively. Pig-1-Bac and Pig-2-Bac were also 2.87 (95% CI = 1.21, 6.80) and 3.36 (95% CI = 1.34, 8.41) times as prevalent when 48 hour antecedent rainfall was greater than versus less than the mean, respectively. Results suggest diffuse and overall poor sanitary quality of surface waters where swine CAFO density is high. Pig-1-Bac and Pig-2-Bac are useful for tracking off-site conveyance of swine fecal wastes into surface waters proximal to and downstream of swine CAFOs and during rain events.

*Michael A. Mallin & Matthew R. McIver & Anna R. Robuck & Amanda Kahn Dickens, *Industrial Swine and Poultry Production Causes Chronic Nutrient and Fecal Microbial Stream Pollution*, Water Air Soil Pollut (2015) 226: 407 (on 10 dates during 2013 investigated physical, chemical, and biological pollution of stream waters (Stocking Head Creek & Maxwell Creek, NC) permitted for collectively 108,068 swine & 1,312,500 broiler chickens in a watershed without industrial or municipal point sources of pollution, 67 dwellings yielding 0.03 septic systems/ha, and containing little traditional crop agriculture. Stocking Head Creek is highly polluted by fecal bacteria, by both measures of the NC criteria for impaired waters. Elevated fecal coliform counts occurred during both wet and dry periods indicating it is chronically polluted by fecal bacteria & did not significantly differ between rainy and dry periods, indicating that surface and groundwater pollution occurs independently of stormwater runoff.)

*Arfken, A.M., Mallin, M.A., Cahoon, L.B., Song, B. (2013). *Monitoring Swine Fecal Contamination in the Cape Fear River Watershed Based on the Detection and Quantification of Hog-Specific Bacteroides-Prevotella 16S rRNA Genes*. Report No. 436. Water Resources Research Institute of the University of North Carolina.

*Michael A. Mallin, Mary Grace Lemon, Matthew R. McIver, *Environmental Quality Of Wilmington And New Hanover County Watersheds, 2013*, CMS Report 14-01, Center for Marine

Science University of North Carolina Wilmington, Wilmington, N.C. 28409 (May 2014)
<http://www.uncw.edu/cms/aclab/>

*Michael A. Mallin, Matthew R. McIver, Amanda Kahn Dickens and Anna R. Robuck, Center for Marine Sciences, *University of North Carolina Wilmington Chronic Stream Pollution in a CAFO Rich Watershed in Duplin County, NC* (2013) (in NC Studies folder)

*Harden, Stephen L., USGS Prepared in cooperation with the North Carolina Department of Environment and Natural Resources, Division of Water Resources, *Surface-Water Quality in Agricultural Watersheds of the North Carolina Coastal Plain Associated with Concentrated Animal Feeding Operations*, Scientific Investigations Report 2015–5080 (2015).

Abstract: The effects of concentrated animal feeding operations (CAFOs) on water quality were investigated at 54 agricultural stream sites throughout the North Carolina Coastal Plain during 2012 and 2013. Three general watershed land-use types were examined during the study, including 18 background watersheds with no active CAFOs (BK sites), 18 watersheds with one or more active swine CAFOs but no poultry CAFOs (SW sites), and 18 watersheds with at least one active swine CAFO and one active dry-litter poultry CAFO (SP sites). The watershed drainage areas for these 54 stream sites ranged from 1.2 to 17.5 square miles. Conventional fertilizers used for crop production are the primary source of nutrients at the BK sites. Animal-waste manures represent an additional source of nutrients at the SW and SP study sites. . . . When compared on the basis of land-use type, there was an overall measurable effect of CAFO waste manures on stream water quality for the SW and SP watershed groups. . . . On the basis of the results of this study, land applications of waste manure at swine CAFOs influenced ion and nutrient chemistry in many of the North Carolina Coastal Plain streams that were studied.

*Arun D. Shendrikar, Joette Steger, Hoke Kimball, Wayne Cornelius, Mark Yirka, Robert Bishop and Neil Joyner, *Ambient Atmospheric Ammonia Monitoring Around Hog Farm Industries in North Carolina* (date unknown – likely 2005 or 2006) (conducted by NC DEQ staff. Copy located in NC specific folder. In 1999, the Ambient Monitoring Section of Division of Air Quality (AMS-DAQ) started ammonia monitoring in the light of exponential growth of the regional hog farm industries. “There remains a merit to continue monitoring ammonia for the following reasons:

–It is a well documented fact (through open literature) that agricultural practices have affects on increased ammonia emissions into the environment.”)

*Deanna L. Osmond, Dana L. K. Hoag, Al E. Luloff, Donald W. Meals and Kathy Neas, *Farmers’ Use of Nutrient Management: Lessons from Watershed Case Studies*, Journal of Environmental Quality – Article, Vol. 44 No. 2, p. 382-390 (March 2015).

(Two case studies, one involving field surveys from three nutrient-impaired river basins/watersheds in North Carolina (Neuse, Tar-Pamlico, and Jordan Lake drainage areas). Results indicate farmers generally did not fully apply nutrient management plans or follow basic soil test recommendations even when they had them. Farmers were found to be hesitant to apply N at university-recommended rates because they did not trust the recommendations, viewed abundant N as insurance, or used recommendations made by fertilizer dealers. Exceptions were noted when watershed education, technical support, and funding resources focused on nutrient

management that included easing management demands, actively and consistently working directly with a small group of farmers, and providing significant resource allocations to fund agency personnel and cost-share funds to farmers. Without better dialogue with farmers and meaningful investment in strategies that reward farmers for taking what they perceive as risks relative to nutrient reduction, little progress in true adoption of nutrient management will be made.)

Travis Lee Kleinschmidt, *Modeling hydrogen sulfide emissions: are current swine animal feeding operation regulations effective at protecting against hydrogen sulfide exposure in Iowa?* Dissertation, Univ. of Iowa, 2011. (Models a large swine CAFO using the air quality dispersion model AERMOD and graphs the estimated concentration of hydrogen sulfide of vs. distance from the CAFO. Reading his graph the concentration of hydrogen sulfide at 3 miles is about half that at 2 miles.)

*Yelena Ogneva-Himmelberger *, Liyao Huang and Hao Xin, *CALPUFF and CAFOs: Air Pollution Modeling and Environmental Justice Analysis in the North Carolina Hog Industry*, ISPRS Int. J. Geo-Inf. 2015, 4, 150-171; doi:10.3390/ijgi4010150 (Published: 26 January 2015) (Uses air pollution dispersion model (CALPUFF) to estimate ammonia concentrations at locations downwind of hog CAFOs and to evaluate the disproportionate exposure of children, elderly, whites and minorities to the pollutant in one watershed in North Carolina and compare between 2000 and 2010. Results show that the average ammonia concentrations in hot spots for 2000 and 2010 were 2.5–3-times higher than the average concentration in the entire watershed.)

EPA, Office of Research and Development (ORD), Land Remediation and Pollution Control Division, National Risk Management Research Laboratory, *Detecting and Mitigating the Environmental Impact of Fecal Pathogens Originating from Confined Animal Feeding Operations: Review*, p.3, (2005).

*Ladd AE, Edward B. *Corporate Swine and Capitalist Pigs: A Decade of Environmental Injustice and Protest in North Carolina*. Soc Justice. 2002;29:26–46.

Centers for Disease Control and Prevention 1998. Public Health Issues Related to Concentrated Animal Feeding Operations. Workshop. Washington, DC: National Center for Environmental Health, Centers for Disease Control and Prevention. Available: <http://www.cdc.gov/cafos> [accessed 26 September 2005].;

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Interview with
12/08/16; 11:00AM

Ex. 6 Privacy

Brent Ducharme, UNC Center for Civil Rights
Elizabeth Haddix, UNC Center for Civil Rights
Mary O'Lone, EPA OGC
Daniel Isales, EPA Region III

Ex. 6 Privacy

In 2007, the NC state legislature passed legislation creating the Lagoon Conversion Program to provide grants to industrial swine operations that wanted to change from open air lagoons to some other waste storage system. The projects were to meet environmental criteria to reduce heavy metals.

Ex. 6 Privacy

Ex. 6 Privacy

Other stakeholders on the Advisory Committee were from the pork industry, USDA, NC Soil & Water's Division of Water Resources, and NC State University. Mike Williams from NC State University, who had been tasked to lead the study of innovative technologies pursuant to the Smithfield Consent Decree also participated.

The Advisory Committee was to determine what the grant money could be used for and develop the application process including a scoring matrix was developed to evaluate the applications. While the group started out with hope, it became clear early on that there was not much enthusiasm from the pork council. **Ex. 6 Privacy** she is not sure if she attended all of the meetings.

She said there wasn't much communication with Advisory Committee members after the initial meetings. By 2008, there was not much push behind the Committee's efforts. She stated that it seemed as though they were crossing off checks to comply with the legislation. She just recently read the Lagoon Conversion Program's 2015 report.

We asked if she happened to have any legislative history for the Lagoon Conversion Program. (We were interested in finding out if there was any discussion that described the justification of why the existing technology of the lagoon spray field should be replaced or why new technologies were needed. We have been unable to find any online or through inter-library loan). **Ex. 6 Privacy** he was not aware of much legislative history, but would check her records.

Ex. 6 Privacy

mentioned that recently Mike Williams had made public statements that since the time of the Smithfield Report, some or all of the of the innovative technologies studied for the report had become economically feasible.

Call with Marianne Engelman Lado; 9/30/16; 9:30 AM

Mary O'Lone, Daniel Isales

MEL indicated that Elizabeth Haddix may join us, but she did not do so in time.

With respect to the confidentiality agreement to the mediation, she indicated that there were two versions of the agreement. They insisted on a change because the mediator was to meet with community members as part of his preparation, which Earthjustice was assisting organizing, and strictly speaking that would have breached the confidentiality agreement. After discussion of the document, which does not state that the agreement itself is confidential,

Ex. 5 Deliberative

Ex. 5 Deliberative

MEL-knows that she still has things on her list that she needs to provide us with; Mary discussed the coordinates discussed with Dr. Wing and the updated tables discussed with Dr. Johnson.

MEL

Ex. 6 Privacy

With respect to the meeting on October 5, MEL stated the following:

1. She will be accompanied by between 20-25 people, which include not only community members, but also representatives from the NC Environmental Justice Network and Waterkeepers (including, perhaps, its General Counsel). She indicated that since EPA had not yet visited NC, community members wanted to have an opportunity to convey what they have gone through and invite EPA to come down to visit.
2. She intends to hand deliver the change.org petition that is addressed to Avi Garbow, which now counts with about 90,000 signatures.
3. She wants to convey their strong desire to participate in any settlement discussions with NC DEQ or the development of any compliance plan.
4. Related to the above point, she wants to convey that they would be strongly opposed to any agreement between EPA and NC DEQ which only addressed the procedural requirements of Title VI (e.g., existence of grievance procedure) and not reach the underlying alleged impacts.

I indicated that I would not be able to participate in the October 5th meeting due to a prior commitment.

Schools In Duplin County

40%> Minority

COUNTY	SCHOOL	BLACK	MINORITY	WHITE
DUPLIN	WARSAW MIDDLE	46.8%	89.1%	9.4%
DUPLIN	WARSAW ELEMENTARY	45.3%	89%	9.8%
DUPLIN	JAMES KENAN HIGH	44%	81.4%	18%
DUPLIN	WALLACE- ROSE HILL HIGH	39.2%	68.3%	31.1%
DUPLIN	CHARITY MIDDLE	37.5%	75.5%	22.7%

EPA

Moderator: Jonathan Stein
June 7, 2016
1:54 p.m. ET

Operator: This is Conference # 163166159.

Ericka Farrell: Hello.

Marianne Engelman Lado: Hi, it's Marianne Engelman Lado and Alexis Andiman from Earth Justice.

Ericka Farrell: Hello Marianne and Alexis. This is Ericka Farrell from Title VI, OCR.

Marianne Engelman Lado: Hi there.

Jeryl Covington: This is Jeryl Covington with OCR.

Johanna Johnson: Hi, this is Johanna Johnston from OGC. I believe we're just going to wait a couple more of more minutes. We're waiting for somebody else to join us on our side. Is Dr. Wing on the phone?

Marianne Engelman Lado: Not yet.

Ericka Farrell: OK.

Elizabeth Haddix: Hi, it's Elizabeth Haddix at the Center for Civil Rights.

Ericka Farrell: Hi Elizabeth, this is Ericka Farrell from the Title VI OCR office and then we also have Jeryl Covington and Johanna Johnson.

Elizabeth Haddix: Great, great. Hope everybody is well.

Ericka Farrell: Yes.

Marianne Engelman Lado: Hello Liz it's Marianne and Alexis.

Elizabeth Haddix: Hey there.

Marianne Engelman Lado: I'm going to send Steve a quick note.

(Unknown female voice): Hello.

Steve Wing: Hello, this is Steve. Sorry for being a few minutes late.

Elizabeth Haddix: Hey Steve, it's Elizabeth and Marianne and Alexis are on too.

Steve Wing: Oh, so we're waiting for?

Elizabeth Haddix: I think EPA's on as well EPA.

Marianne Engelman Lado: They're on yes. Hi Steve.

Steve Wing: Hello.

(MEL or EH): So we have folks who will introduce themselves in the office of civil rights and the office of general counsel. I think they were also waiting for one more staff member from the Office of General Counsel.

Mary O'Lone: OK. I think EPA's also here now too.

(Unknown female voice): OK, great.

(Mary O'Lone): Do you want to...

Ericka Farrell: OK. So is Dr. Wing?

Johanna Johnson: Yes, he joined us.

Ericka Farrell: OK, good afternoon everyone. Again this is Ericka Farrell from the office of civil rights with the U.S. Environmental Protection Agency in Washington D.C. and thank you for taking the time to talk with us. And as you know the

office of civil rights is investigating whether North Carolina Department of Environmental Quality, sorry, regulation of swine feeding operations discriminate against African Americans, Latinos and native Americans on the basis of race and national origin and neighboring counties and violate Title VI in EPA's implementing regulations.

And just so that you know, this interview will be recorded. And for the record Dr. Wing, can you please provide your full name?

Steve Wing: My full name, Steven with a V, Bennett Wing.

Mary O'Lone: And can we – this is Mary O'Lone from EPA Office of General Counsel. Can we just go around and say all who's on the phone before we sort of launch in here? So this is Mary O'Lone from the office of general counsel at EPA and we'll go around the room here.

Johanna Johnson: Hi, this is Johanna Johnson. I'm also from General Counsel at EPA.

Jeryl Covington: This is Jeryl Covington with the office of civil rights at EPA.

Ericka Farrell: And again this is Ericka Farrell from the Office of Civil Rights Title VI office.

Mary O'Lone: Marianne, you want to do your group?

Marianne Engelman Lado: Sure so I'll start. It's (Marianne Engelman Lado) and I'm with Earth Justice. (Alexis)?

Alexis Andiman: Alexis Andiman also with Earth Justice.

Marianne Engelman Lado: And Elizabeth.

Elizabeth Haddix: Elizabeth Haddix at the UNC Center for Civil Rights.

Brent Ducharme: Brent Ducharme also at the Center for Civil Rights.

Ericka Farrell: OK, that's it.

Mary O'Lone: And then Dr. Wing. OK yes.

- Ericka Farrell: OK. Now again Dr. Wing could you provide us your professional contact information specifically your office address, office telephone number and office email.
- Steve Wing: Yes. My address is Department of Epidemiology, Campus Box 7435, University of North Carolina, Chapel Hill, North Carolina 27312. Phone, 919-966-7416. Email, steve_wing@unc.edu.
- Ericka Farrell: Thank you. And we're going to start with a line of questioning.
- Mary O'Lone: So this is Mary O'Lone and I wanted to say you know thank you Dr. Wing for making yourself available for the interview and that you know if at any time you need to take a break or we need to break just let us know and we'll do that. And then also if we need to end early and you know reschedule or whatever we'll make whatever accommodations we need to.
- Steve Wing: Thank you.
- Mary O'Lone: But we very much appreciate you making yourself available. So we're going to start off with some quick sort of one off questions and then get into more of a general conversation as we go on. The first question was just was – is have you ever conducted any research that was funded by the pork industry?
- Steve Wing: No I have not.
- Mary O'Lone: Have you ever conducted any research on behalf of the North Carolina legislature such as the environmental review commission or any part of the North Carolina legislature?
- Steve Wing: No I have not.
- Mary O'Lone: OK. And this is just a general question about your research. So we see you know we see that you've focused on the swine industry and I'm just sort of wondering if you could give us a little background as to why not all CAFOs in North Carolina but you know why you focus on swine.
- Steve Wing: Well I was introduced to the problem in 1995 when I began to meet residents of eastern North Carolina who were impacted in their neighborhoods by swine

operations. So I followed and I researched. I learned early on that there were – there was quite a bit of research about the swine confinements, the new liquid waste management systems. But it was almost entirely about the engineering of the waste pits and the spray fields, animal nutrition, veterinary practices and so on and there was not any literature on environmental health impacts.

And because the residents that I met believed they were being most affected by the swine industry and keep in mind this is 20 years ago, I decided to focus on that. The poultry industry had not expanded as much at that time as it has now. Also because of the engineering waste management practices, the liquid waste systems I believe had more potential for impacting neighbors than the dry litter system that most of the turkey and chicken operations use.

They are not benign but at the time I began it appeared to me that the swine operations were more important and furthermore they had developed very rapidly. The number permitted had increased very rapidly. And one of the other – one of the other issues that was brought up repeatedly by the residents that I met was that these facilities were disproportionately placed in communities of color. So it was that combination of issues that led me to focus on the swine operations.

Mary O'Lone: I have a question about you know the increase in the number of swine over time and I have to be – I have yet to figure out the answer to it and I'm hoping maybe you can help me. So in your declaration you say that between, I think it was the early 80s and 2007, the number of swine increased from 2 million to 10 million. And then we also see that there was a moratorium on the expansion of swine facilities and you know permitting of new facilities between '95 and 2007. And I've been trying to figure out if there's, you know when I read the sort of plain language of what is a moratorium and no expansion and no new ones, how the numbers of pigs jumped.

Steve Wing: The expansion was primarily during the period of between the early 80s and 1998 and thereafter the numbers fluctuate. There were some facilities that had applied for permits before the moratorium that weren't able to open, but for the most part the growth was between around 1980 and the late 1990s.

Mary O'Lone: OK, all right. Now we have some specific questions regarding the disparity studies and then after that we're going to just sort of focus on your interaction with North Carolina DEQ and the swine regulatory – the swine waste regulatory process. But we had a specific request about the October 19th, 2015 update. And you know we read that you had basically cleaned the coordinates, you know to make sure that you had the right ones before you did the analysis. And we were wondering if we could get – if we could get those coordinates and any information you have describing the changes that were made to the North Carolina coordinates and the reasons for those changes.

Steve Wing: Definitely. I'm, you know I haven't done the programming myself, but I can contact either Jill Johnston or one of the research assistants at UNC and we can provide that to you.

Mary O'Lone: OK that'd be great. We have spoken to – we spoke to Dr. (Johnston) I'm sure (Marianne) told you and she was able to answer some of our questions about the 2014/2015 study, but we still had a couple that we would like to ask you. And you know part of this is just – a lot of it is us, we're not epidemiologists, trying to get a firm grasp on how we articulate to policy makers within EPA and those that we have to talk with. You know being able to explain in very plain terms what your study says and, you know, what it means.

And one of the – one of the questions that we have is just about getting a grip on the methodology that's used to count people in the two studies, in the one you did in 2000 and in the 2014/2015 study. And we were trying to figure out different ways to, you know, have you help us. And I think what we came up with we thought might be the easiest would be for the 2014/2015 study would be to look at table four and just, you know, march us through the numbers. Do you have it in front of you by any chance?

Steve Wing: I'm looking at table four right now from the updated study.

Mary O'Lone: From the – right. So it's at the top of page 14, right. Make sure we're talking about ...

Steve Wing: That's right.

Mary O'Lone: OK.

(EH or MEL): Can you hold on just a second? I'm just pulling it up as well.

Mary O'Lone: Sure, sure.

(EH or MEL): So this is from the 2015 study?

Mary O'Lone: Yes, the 2015 study.

(EH or MEL): OK.

Mary O'Lone: And I was hoping this would help us you know just sort of generally march through how it's done because I have read and reread it the study and just tried to figure it out and it's me. I'm sure. I just have a, I have a tough time processing this kind of information. So in the first column the percent people of color, what you're – that is the, that represents of – tell me what that – tell me what that represents there, that column?

Steve Wing: OK. So the first column percent POC are the ranges of percent for census blocks. So there are if you look at the first and second columns, there are 559,179 people who live in census blocks with no people of color.

Mary O'Lone: And the census blocks are – the census blocks that you're counting are those that have a centroid within three miles of a CAFO, right?

Steve Wing: No this is in this case this is all the census blocks in the study area.

Mary O'Lone: All the census blocks in the study area, OK.

Steve Wing: So the sum of the column population yields the total number of people in the study area. Because everyone in the study area lives in a block that either has no people of color or has less than 20 percent, 20 to 40 et cetera up to 80 to 100 percent people of color.

Mary O'Lone: OK. And to get into the study area you had to be a census block that had a CAFO in it?

Steve Wing: No, that's not the case. The study area was defined as the whole state minus ...

Mary O'Lone: OK, right.

Steve Wing: The five major cities and the western counties which have no permanent CAFOs either in those counties or an adjacent counties.

Mary O'Lone: OK and these are all ...

Steve Wing: And that's we made following the work we had done previously that had been peer reviewed.

Mary O'Lone: Repeat that. I think I interrupted – I was going to interrupt you but so...

Steve Wing: The decision about how to define the study area mirrored the decision we made in our 2000 publication.

Mary O'Lone: Right, OK. OK, so this is – these are the populations in the study area, OK. So then the ratio's comparing the percent of people residing within three miles of an IHO in blocks with people of color compared to blocks without people of color?

Steve Wing: No, that means that there's a – what we have is the population of each of the categories, the percent people of color, that lives within three miles in a census block within three miles of an IHO divided by the total population gives the percent of people in that group that live within three miles of an (IHO). The ratio column is the ratio of each of the categories above zero to the proportion in the zero category.

Mary O'Lone: Right.

Steve Wing: And it's a way of comparing to look for whether there's a trend across the categories of people of color.

Mary O'Lone: OK. Ok. And then the 95 percent CI, can you explain that?

Steve Wing: That's CI stands for confidence interval. There's for each of these ratios there's a statistic called the standard error and the 95 percent confidence interval is a standard way of expressing that. It's the standard error times 1.96 subtracted from and added to the prevalence ratio. And it gives an idea of the amount of data that each of these ratios is based on. So, s narrow confidence intervals and these are narrow shows that, if a few people were moved one way or the other it wouldn't make any difference to the prevalence ratio. It's a very stable statistic.

If, for example, looking at the 0.75 in the second row, the confidence interval is 0.74 to 0.75. So, you could move people back between categories and it wouldn't result in much change. But if the confidence interval were say 0.30 to 2.8 then by moving a few people you would get quite a different prevalence ratio. And we provide these confidence intervals because they're very standard. I didn't spend much time writing about them.

Mary O'Lone: Yes, that's all right.

Steve Wing: And but if this report were to be read by an epidemiologist or a statistician or an economist or someone else who uses these kinds of statistics they would expect the confidence intervals to be provided.

Mary O'Lone: OK, thank you. OK now we were going to look at the 2000 study. Do you have that with you by any chance?

Steve Wing: I'm sure, I haven't kind of – no, I have to open it up. Just a moment.

Mary O'Lone: OK. Well, you know, maybe we don't even need to have you look at it in particular but ...

Steve Wing: Yes, I remember it pretty well.

Mary O'Lone: OK. Was there the difference between the way you counted, you developed, who was impacted, how you counted the people, seems to be slightly different. So maybe if you could just ...

Steve Wing: It is slightly different and I can explain that.

Mary O'Lone: OK.

Steve Wing: So in the 2000 study we wanted to analyze both race and poverty. Poverty is not a variable that's available for census blocks. Census blocks are the smallest enumeration unit used by the U.S. Census Bureau. Race is available at the census block level but not poverty. Block groups are larger geographic areas.

And that study was based on whether there was an IHO in the block group because those areas are large enough to be able to contain potentially numerous IHOs. In the current study we were not looking at poverty and that's because of the way Title VI is written. We just were looking at race and ethnicity. So we could use the census blocks which are much smaller and they would be more specific to counting people and their proximity to the IHOs. So they are less heterogeneous because they're smaller.

Furthermore, we had the benefit of 15 years or so of research where we were getting an idea of, more quantitative idea, of how far away people could be impacted by the air pollutants from these facilities and we chose three miles. At some point any particular radius is arbitrary. Three miles had been used in some of our prior work and based both on our measurements and our interviews with people we felt that it was clear that people can be – can experience negative impacts of the air pollutants at that distance.

So in the latter study the 2015 report, we considered people potentially exposed if they lived in a block that was within three miles of an IHO as opposed to the first study where people were potentially counted as potentially exposed if they lived in a block group, a collection of blocks that had an IHO. And the difference is because of number one, our focus on race and ethnicity, and number two, our increased understanding of the distance over which these facilities can affect people. Does that answer your question?

Mary O'Lone: That answers it perfectly, thank you. And it answers another question that we had about you know over time it seemed like the – you had, there were different distances in different studies, but the more recent ones we're seeing seem to be focusing on this three mile distance and so ...

Steve Wing: And I would call your attention to the most recent study that was provided in your materials published just earlier this year in which we measured hydrogen sulfide at public middle schools. And in that study the quantitative relationship between the hydrogen sulfide levels at the schools and the area of the swine farms that are up wind is about three miles, five kilometers.

Mary O'Lone: Right, right, yes I read that. And I have a quick question about that study. As I read it, what I understood it to say is that the monitor was placed downwind, meaning the wind blows from the CAFO to the monitor at the school and that the measurements of the hydrogen sulfide tended to be higher when the wind was not blowing, when the air was just kind of hanging around.

Steve Wing: OK, let me elaborate ...

Mary O'Lone: But there was no measurable, OK.

Steve Wing: Just to clarify that.

Mary O'Lone: OK.

Steve Wing: The monitors were at the schools continuously for several weeks. So during the time the monitors were at the schools the wind blew from different directions and sometimes it was wind speed was below what's detectable, so the air was pretty still. So the monitors were in place during all those conditions, whatever direction the wind was coming from or however fast it was blowing. And what we found was that the hydrogen sulfide levels were very strongly correlated with the number of – or with the area of the swine farms up wind at the hour that the measurement was made.

So basically we took all the hours that were during which the monitor was operating at the school, we divided the weeks up into hours and for each hour we assigned a wind direction and a wind speed. And for those hours when the wind was coming from a direction where there were IHOs and more IHOs and more nearby IHOs, the hydrogen sulfide levels were higher.

Mary O'Lone: OK.

Steve Wing: And when the winds were coming from other directions the hydrogen sulfide levels were either undetectable or lower.

Mary O'Lone: Thank you, that was very helpful. OK, so that was a digression. We're going to go back to the – we're going to go back to the 2000 study and the 2015 study. Were there any critiques or criticisms of the 2000 study when it came out?

Steve Wing: Well I received some verbal criticism and concern. I'm not aware of, you know any publications or letters to the editor or to the journal or anything like that that challenged any of our findings or our methods.

Mary O'Lone: And what – and by verbal criticism what do you mean?

Steve Wing: Well, in maybe it was early 2000 I presented a version of this paper at the annual meeting of the Society of Toxicology I was invited to present the results there. And after I presented the results there was some press coverage and I was called to the North Carolina House of Representatives agriculture committee to testify about this study. And some of the legislators were- they seemed to be concerned about our findings.

I wouldn't say that the criticisms were about – they were not like scientific criticisms about how we analyzed the data or about the quality of the study. It was about our findings that there was this disproportionate impact. Actually I don't know if you have a copy of it but I wrote an article about that experience, that includes a description of that of my appearance before the house agriculture committee. I think it was published in 2002 and it also describes the Pork Council's use of the Public Records Act request to try and obtain confidential information about the study participants in one of our subsequent studies.

And if you're at all interested in the potential that researchers might be, might face some kind of intimidation tactics when they research this topic I could send you that paper.

Mary O'Lone: Yes, would you please.

Jeryl Covington: Dr. Wing, this is Jeryl Covington. I do have one question about your presentation at the legislature. Do you have a copy of or do you know if that was a recorded meeting or open to the public where minutes might be available from your presentation?

Steve Wing: You know I've never seen any and I don't know, I really don't know whether there was a recording or minutes were taken.

Jeryl Covington: OK. Do you know if you were in a recordable room in the Archdale building?

Steve Wing: I was in the Archdale building in a committee meeting room, but I don't know what their technology was.

Jeryl Covington: OK.

Mary O'Lone: OK, thank you. So ...

Marianne Engelman Lado: Let me – this is Marianne. Let me just say we'll work with Steve to collect all this stuff and then we'll send it on to you.

Mary O'Lone: That's great. Thank you.

Steve Wing: And I would also mention you know just (in turn) that there were some pork industry lobbyists at that meeting who approached me after the public session to express their discontent.

Mary O'Lone: You mean after the – after you gave your testimony?

Steve Wing: Yes, that's right. And so these criticisms are not written or public to my knowledge but you asked if there were criticisms and that's what you know in particular what stands out for me.

Mary O'Lone: And is that, were those – do you have that recorded in the article you wrote?

Steve Wing: Yes, I have some information about that yes.

Mary O'Lone: OK great, thank you. Well the next question was like a follow up to that as to whether anything you heard about the 2000 study led to a change in the methodology for 2015.

Steve Wing: No.

Mary O'Lone: OK.

Steve Wing: As I said, the criticisms that I heard were not about how the study was conducted or the data quality or the analytical methods. It was only about the findings and our interpretation.

Mary O'Lone: OK. And maybe just can you just tell us what the basis was, what the criticism was about the findings?

Steve Wing: Basically it was, the criticism was, well what do you expect? This is where the industry goes and it's poor and communities of color.

Mary O'Lone: What? No he's saying that ...

Steve Wing: So basically the point that this shouldn't be surprising and it's not really news or anything.

Mary O'Lone: Right, OK. OK, so the 2014/2015 study, did – was that sent, to it was well. I guess the 2014 study was sent to North Carolina because it was attached in DEQ, NCDEQ because it was attached to the Title VI complaint, right Marianne? They got it because it was one of your exhibits and you sent everything to them when you filed the complaint?

Marianne Engelman Lado: I think that's correct but we will double check that.

Mary O'Lone: OK. Did you bring that 2014 study and or the update the 2015 study, other than as a part of the Title VI complaint for the 2014 one, to North Carolina DEQ's attention?

Steve Wing: No, no I didn't work directly with them.

Mary O'Lone: OK. Marianne did you by any chance when you sent it to us, the update did it go to them?

Marianne Engelman Lado: I don't believe it did but I can check that.

Mary O'Lone: OK. So have you ...

Steve Wing: So just to clarify for me, DEQ is aware of the civil rights complaint. Is that true?

Mary O'Lone: Yes.

Steve Wing: They have a copy of the complaint, is that true?

Mary O'Lone: Yes.

Marianne Engelman Lado: So I'm going to double check this, but my recollection, you know we before filing the complaint we submitted comments on behalf of a number of groups. You hadn't done the analysis yet, but raising the concern that there was a disparate impact based on all the research that had been done up till that point and asking DEQ to do a disproportionality analysis and a disparate impact analysis. Then when we filed the complaint we – my recollection and I can I'll again, double check, my recollection is we gave them a courtesy call and we sent them a copy as well.

Part of the reason I want to double check is I recall that there was one confidentiality issue and I recall our needing to let both EPA and DEQ know that that one particular map needed to be redacted and that we would send subsequent information. So my recollection is that we sent DEQ the whole package the first time around. Now when we've sent EPA subsequent filings I don't believe that we have sent DEQ additional information. And of course we went through mediation and in the mediation it was clear that they had received the complaint, and it's not clear that they had read it, but they had received it and you know, by that time it was more than a year had passed. So they definitely have the complaint and the study, the first study but I will check to confirm all that.

Mary O'Lone: OK, thank you. So since – and maybe this is addressed to both Marianne and Dr. Wing. Since – have you heard anything from DEQ about the 2014 one? Because if they got one that would be the one they got, right?

Steve Wing: I haven't heard anything from DEQ directly. In fact, but that's not unprecedented. They've never contacted me about any of our research.

Mary O'Lone: OK, well that's going to short circuit a lot of our questions coming down the line here. So we'll get to that to.

Steve Wing: They've had you know they've heard some of the research. I feel quite confident including at the North Carolina environmental justice summit. But they have not approached me with any questions or requests for further information.

Mary O'Lone: OK. So for the 2014 study I guess, I'm debating whether to ask this, but I'm just going to go ahead and ask it. So ...

Marianne Engelman Lado: And Mary, I'm sorry can I interrupt you? When you say 2014 study can we just be clear about which one we're talking about because we I think we've – you're not talking about the updated and that disparity analysis that came out in October.

Mary O'Lone: Right, I'm talking about the – well, we can say the 2014/2015 study. But I'm my assumption is that it wasn't made available – the 2015 update had not been sent to DEQ. The only thing they would have gotten thus far is the 2014. So the question is just you know has there been any feedback from North Carolina DEQ on the '14 or the update? And the answer seems to be no.

Steve Wing: From my knowledge correct and there's been no response.

Mary O'Lone: Have you had – has there been any response or anything from the pork industry?

Steve Wing: Not to my knowledge.

Mary O'Lone: OK.

Steve Wing: And this is a topic which is a little bit sensitive. I realize this is not your question directly, but I should mention, I believe you have a copy of the letter that I and some of my colleagues sent to Christine Lawson at DEQ before the new general permit was approved.

Mary O'Lone: Yes.

Steve Wing: You know I have to, I should let you know, that I was told by an official at the National Institute of Environmental Health Sciences that I had violated their policy for extramural researchers by sending that letter. So my contacts with DEQ are of concern to the funding agency that supported most of the research described in that letter because their – they, they have told me that although there was a request for public comments on the general permit which is what I was responding to, that I was only supposed to inform public officials about our research if I was asked as an individual. And so this is another kind of difficult issue regarding working under federal grants is that National Institute of Health apparently has some concern about informing government officials about research conducted with support from NIH.

And so this is – and the reason I bring it up is because it's to some extent, well to a large extent, a disincentive for me to engage in any conversation with government officials including DEQ ...

Mary O'Lone: I see.

Steve Wing: Unless they initiate it.

Jeryl Covington: Dr. Wing let me ask you when they, when you receive that information was that one of the stipulations of grant you accepted? That's what they were outlining for you?

Steve Wing: It's not in the grant but it's a policy that was adopted I believe in 2014 but possibly 2013.

Jeryl Covington: OK. But your presentation, your public comments would have preceded that policy initiation or just in the same timeframe of the general permit being

issued? Which came first, the policy or the public hearing request by DENR at the time when the general permits were being renewed?

Steve Wing: OK, so I'm looking at the date of my letter to Christine Lawson. It's December 2013 so I'm off by a year. I just slipped there. So the policy came out I believe in 2013 or possibly 2012.

Jeryl Covington: OK because I'm looking at – I'm looking at one of the postings for the public meeting on the general permit it's dated October 28th, 2013.

Steve Wing: Right, I did not appear at that meeting.

Jeryl Covington: OK.

Steve Wing: The admonition that I received from NIEHS was about the letter that I wrote.

Marianne Engelman Lado: So that is referring to – I'm sorry. Is it exhibit two of the complaint filed in September of 2014.

Mary O'Lone: Right, his comments on the general permit.

Marianne Engelman Lado: Correct.

Jeryl Covington: Yes.

Marianne Engelman Lado: And can I just (while) I've interrupted already, the CC list that you asked about on the complaint filed September 3rd, 2014 with your initial study and all of the exhibits included Christine Lawson, Division of Water Resources at DENR and Tom Reeder, Division of Water Resources at DENR. So DENR received, now DEQ, received the original complaint with all of the attachments including the 2000 and – what we're calling the 2014 disparities analysis. We did not have that CC list on the subsequent letter we sent on April, you know or other correspondence that we have.

We're assuming that the Office of Civil Rights is collecting information from DEQ that we're not receiving and we are sending information to the Office of Civil Rights that we similarly are not giving to DEQ. So we didn't, it's my recollection that we did not send that – any subsequent information after the

complaint. We got no response to the complaint and then we did not send any additional information, nor did they ask for it after sending the complaint.

Mary O'Lone: OK. All right, thank you. Actually I just want to ask a question about NIEH. Maybe we can talk. So prior to that policy it would have been fine for you to send comments in on a general permit?

Steve Wing: That's my understanding.

Mary O'Lone: OK. For the 2014/2015 study are there any areas that you – any adjustments you'd make to it or that you, you know, would explore if you had more time, money you know whatever however you might want to adjust it?

Marianne Engelman Lado: Before answering just so I'm clear, Mary when you call it the 2014/2015 study, I'm not clear what that is. Can we call the first study 2014 and then the updated study so we just distinguish between them?

Mary O'Lone: Sure. The 2014 study that was updated in 2015.

Steve Wing: Right. I would you know if I had had time and support I would potentially shorten the report for submission to a peer review publication but I wouldn't change the analysis.

Mary O'Lone: OK. Are there any plans to have it submitted for a peer review or publication?

Steve Wing: It's something I want to do, but I've been occupied by other concerns and so I haven't done it yet.

Mary O'Lone: OK. Well our next question was about the distances and we went through that. We did the 95 moratorium. OK, so now we're going to – now we'd like to talk about the renewal process, the general permit and the renewal processes. And so we have your comments for the 2014 process. Did you participate in any of the previous renewals, providing comments and your studies, whatever the studies you had to that point, you know, to DEQ?

Steve Wing: No, I did not.

Mary O'Lone: So this was the first one? OK. All right so now we're going to – we're going to run through the North Carolina specific study and we're kind of going to ask the same questions about each study. And starting with the your 2000 study about occupational and community health effects. So the – well basically the questions we're going to ask are, you know was that, did you or are you aware of that study being brought to the attention of North Carolina DEQ or any other state agency?

So, for example, the first one is about occupational health you know, was it sent to any other state agency that might have jurisdiction over the issue and then to any local agencies? And, if so, was there a response to it? Were any actions taken after they heard about it? And then depending on the study just we're just asking if the methodologies that were used like in the air study were they the kind – is it the methodology that would be used by North Carolina DEQ's air quality division? Or if it's a water analysis were the protocols there the kind that DEQ would use?

So we're just going to sort of march through each study and ask these questions.

Steve Wing: OK so ...

Mary O'Lone: Do you want to take a – do you want to take a break or anything?

Steve Wing: I think we can keep going at this point.

Mary O'Lone: OK.

Marianne Engelman Lado: Can I just mention before Dr. Wing answers from his point of view that I don't know the full range of ways in which DEQ might have seen these studies, heard about these studies, you know government meetings, professional organizations. We know something about, and Steve you can talk about the you know you've already mentioned the summit and their appearance at the summit. But I do at least want to point out that in December of 2013, you have it as exhibit three attached to the complaint, Earth Justice, Water Keeper and Southern Environmental Law Center submitted comments

on the permit renewal that's the subject of the complaint which cites to many of these studies just looking at it quickly.

For example at footnote 18 cites to Wing and Wolf among others. Footnote 21 cites to Wing and all potential impact. So I don't know how Dr. Wing would possibly have known all the ways in which that information might get to DEQ but you have in your possession at least one example of ways in which that was formally presented to DEQ before they made the decision on the permit.

Mary O'Lone: Yes, yes. And that's sort of what – we're only asking him what he knows about not, you know the ways that he knows it that it may have been brought to their attention. So the idea being these studies you know we're going back to 2000 there have been – general permit has been renewed a couple of times, right in this intervening time period. And so what I'm trying to see other than the fact that he has just said that he didn't participate formally in the hearing process, submit written comments into previous renewals, is he aware himself because maybe he did it or he participated in you know some meeting with the DEQ or whatever where they were made specifically aware of the studies. OK?

Marianne Engelman Lado: Yes, I mean go ahead. Yes, I want to make sure you use his expertise and time efficiently but feel free. Keep going.

Mary O'Lone: So and I understand they were all brought – they were all brought to the attention of the DEQ in your comments in 2013. What I'm trying to get at is, prior to that, had there been prior instances where any of these studies were formally brought to their attention. That's what I'm trying to get at. And you know we can march through all of them or just if there's a general answer of that he can give that's fine too.

Steve Wing: Well I can say that the Wing and Wolf study from 2000 that Marianne just mentioned, that study was the results were first released by the North Carolina Department of Health and Human Services before the paper was published in the peer review journal. And I can't believe that they would have been

unaware of that because there was press coverage and so on. But I didn't send it to them directly and I don't know if DHHS did.

Other than that I can only give the general answer that they have had personnel at our environmental justice summit where some of this research had been presented and discussed in addition to they having the opportunity to hear from neighbors of these facilities who described their personal experiences and difficulties and impacts of the air pollutants on their quality of life, ability to use their property, their health and so on.

Jeryl Covington: Dr. Wing this is one question. You said at the environmental justice meetings that have happened, the network meetings, you said DENR or DEQ representatives were there. Are you meaning the secretary or members of the water quality section? Who are you referring were at the EJ network meetings?

Steve Wing: I don't have a list of who was there but I'm sure the secretary never came, I'm sure Christine Lawson came. I don't know what years. I don't have a record of that. And I believe other DEQ who are Department of Environment and Natural Resources staff came and there's when Christine did not come.

Mary O'Lone: So the environmental justice summit, I mean Marianne do you have information on these meetings when they occurred and who they were with or?

Marianne Engelman Lado: Yes, we can get you more information about that.

Mary O'Lone: All right, yes. So the – so maybe we can follow up on that later and sort of figure that out. But it sounds like what you're saying is that over the years there have been a series of these meetings, DEQ's been invited and DEQ officials have shown up and that and you've made presentations there about your research.

Steve Wing: I have and so have other colleagues who participated in these studies.

Mary O'Lone: OK.

Jeryl Covington: And this is Jeryl again. I have one question. You mentioned that the Department of Health and Human Services released your Wing Wolf 2000 study. What were their comments to that? What reactions or follow up did you get from the Department of Health and Human Services?

Steve Wing: They actually provided financial support for that work. So their announcement of the findings took the form of a press release basically describing the results of a study that they supported.

Mary O'Lone: And then what happened? Then ...

Steve Wing: Then what happened was on the same day that the press release came out the North Carolina Pork Council filed a Public Record Act request. It was to me and my colleague Susanne Wolf, copied to the UNC general counsel, as well as to the DHHS division that funded the study, demanding under the North Carolina public records statute, all records associated with this study, including the identities of the participants, who, I should note, we had to protect their confidentiality in order to do this study under federal regulation.

Mary O'Lone: OK. So this was partially funded by the federal government or it came a grant through the state?

Steve Wing: Partly funded by NIEHS and partly funded by the North Carolina DHHS.

Mary O'Lone: OK, OK. And so did the Department of Health do anything after just releasing the study? Was there any sort of change in the world?

Steve Wing: You know I'm not sure. You know, unfortunately, what you're pointing out or the line of questioning is pointing out is how isolated many of us academic researchers are from the policy arena. And this is part of academic culture and it's reinforced by government agencies that are concerned that we would actually influence policy, the NIH policy to wit and we're not supposed to contact public officials.

So I've spent most of my time and effort getting the research into the open literature. I've spent some time with reporters. It's been covered not only by you know in the academic journals but to some degree by periodic journalist

reports. But I'm not working in a culture that has close connections with the regulators and you know I think that's a problem and I will admit to you that it is. But partly we can't all do everything. And given the pressures to keep my funding and teach and advise students and so on which I have to do to keep my job, it leaves limited time to engage in dialogue and routine conversation with regulators.

Mary O'Lone: OK.

Steve Wing: I mean just to explain my situation.

Jeryl Covington: Yes Dr. Wing let me ask one question here. You mentioned funding. After you did the publication with the Department of Health and Human Services, the press release was submitted and you got the request for information by the Pork Council, did that impact your funding that was issued - was – did you view that as being retaliatory in nature, the request ...

Steve Wing: At the same time I know there was a pork industry request that came through a U.S. senator for NIEHS to investigate our grant. I was told that by our grants officer at NIEHS. We maintained our funding at that time so they did not determine that we had done anything wrong, presumably. But at – I mean it took a lot of time and grief to deal with that but I don't believe at that time it influenced our funding from the federal government.

Jeryl Covington: What about at the state level because I'm assuming that there was a pass through of the federal funds to the state level Department of Health and Human Services?

Steve Wing: No, actually the funds we got from DHHS North Carolina DHHS were not federal funds, they were state funds. And we did not receive any more state funds for this kind of work ever again.

Jeryl Covington: OK. Let me ask you this and I hate to go back but on the press release from DHHS do you feel like they were supportive of your work, dismissive of your work? What you know I want to I guess get clarity what did ...

Steve Wing: Right. I believe they were supportive of our work.

Jeryl Covington: What did they do with – what did they do to further it? You said that you received no other state grant, but what did they do to further the study that you and Wolf prepared?

Steve Wing: I'm not aware that they – I'm not aware of what they did beyond make public the findings. I mean I've always presumed that the North Carolina Department of Environment is not in a vacuum that's insulated from all information on the outside produced by government and academic scientists. Now, maybe I'm naïve about this but I've assumed that there was at least through press coverage or some other means that there was some way that they would know about something that happens outside of their department.

Jeryl Covington: Now even with that press coverage can you go back and clarify for me, I apologize, I just want to make sure I understand, were you contacted by any other agencies or any other industries besides the Pork Council after the press release by DHHS?

Steve Wing: No.

Jeryl Covington: OK.

Steve Wing: I mean I was contacted by people associated with the pork industry. In writing, also by phone.

Mary O'Lone: And can you just talk a little bit about that?

Steve Wing: Well the part in writing was the Public Records Act request. I also received at least one phone call, maybe more than one from someone who wanted to talk with me about getting the identities of the study participants. And then gosh that reminds me, I also had some kind of bizarre voicemail that was accusing me of, gosh I don't remember, may have called me a communist or something like that but I didn't pay really pay any attention to it.

Jeryl Covington: Let me ask one question. Who – since you lost this particular state funding, who's funding you at a state level for your continuation in this particular area if you don't mind?

Steve Wing: We have received no further state funds since 1999. I should say that the state health director at that time in 1999 was interested in the problem of these industrial swine operations and their impact on neighbors but he did not continue in his position beyond 2000. So I think it was partly through his interest that we were funded.

Jeryl Covington: How many applications or submissions of study details have you presented back to DHHS or any other state agency for potential funding?

Steve Wing: We have not. They to my knowledge they do not have extramural grant programs set up to fund researchers like me. The one that we had, the funding we had for the 1999 study which was published in Environmental Health Perspectives in 2000, that study you know Wing and Wolf study was funded because we were collaborating with epidemiologists at DHHS. So it wasn't as though – we didn't apply for it independently.

We were actually collaborating with them because people in DHHS believed that there were problems that needed to be documented. And so they were present at the design phase of that study and participated in deliberations.

Marianne Engelman Lado: I'm this is Marianne. I just want to be cognizant of the time and aware that we sent to you the Office of Civil Rights a tremendous number of significant peer review papers on you know on the impact of hog operations on children, on health effects, on a variety of outcomes. I'm sure you all are watching the clock too, but want to make sure you have time to ask Dr. Wing if you have any methodological or other questions or questions about his declaration as well.

Mary O'Lone: Thank you. We don't actually have any questions I guess Marianne. We've read the studies, we don't have any questions on them right now. And you know to the extent we do we'll follow up and you know either you know work with Dr. Wing if he's available or you know the co-authors if that's possible you know like we were doing before.

So really the last question we had because this was the – this was the information we were most interested in right now was you know Dr. Wing's particular perspective from working in the area for a long time and getting an

understanding of how North Carolina has been you know apprised of this from perspective only and then what responses there may or may have not have been to them. And so you know sort of a wrap up question that we had was if you'd had any other if you had any Dr. Wing had any other – had interactions with North Carolina DEQ outside of the EJ summit, which it sounds like there was some, and submitting the comments in December 2013.

You know any interactions that you've had with North Carolina DEQ or any other part of the North Carolina state government either the department of agriculture, labor you know HHS over the issue of regulating swine CAFOs?

Steve Wing: I'm sure I can say very little. I should before I say definitively I could check my list of presentations that's on my CV. I'm trying to remember. I think they were mostly there was an EPA presentation but maybe not to – not to North Carolina's DEQ.

Mary O'Lone: OK.

Steve Wing: Now here it is. Now let's see, no hold on that's not it. Sorry, I wasn't prepared for this question.

Marianne Engelman Lado: In your legal research and testimony section, page 30 of your CV says the state of North Carolina, Wade County Office Administrative Hearings there was a case that was involving North Carolina there. That has been a ...

Steve Wing: Right. That was not about swine operations.

Marianne Engelman Lado: OK.

Steve Wing: But there is a section of my CV that begins on page 16 and which includes many public presentations about these – about this topic, as well as other topics I've worked on the course.

Mary O'Lone: OK.

Steve Wing: It includes academic meetings in universities met at North Carolina State University where I'm pretty sure the one in 2010.

Mary O'Lone: The November 11th, 2010?

Steve Wing: Yes, that one I'm almost positive there would have been DEQ people there but I can't give you any names.

Mary O'Lone: OK, that's all right. That helps.

Steve Wing: And if I may quickly scan through there I might be able to call your attention to another one.

Unknown Female Speaker: Do DEQ people ever come to your school and participate in any of the presentations that you have in UNC?

Steve Wing: Not to my knowledge.

Unknown Female Speaker: Or your presentations at Research Triangle Park?

Steve Wing: Not to my knowledge.

Mary O'Lone: OK. In your experience have you ever seen any evidence that suggested that the swine farm industry – well that North Carolina has better protected non-minority communities from the impacts from swine farms? Is there – is there ...

Steve Wing: Well I can give you my opinion on that.

Mary O'Lone: OK.

Steve Wing: And it's I believe it's informed by experience although it's not something I could give you an equation and make a calculation of my conclusion here. But I strongly believe that these facilities would not have been permitted to operate as they do if they were primarily located – primarily located in predominantly white areas in the in other parts of the state. The facilities have extremely obvious impacts. If you go there, if you, I mean and you could now – let me make clear.

You could go there for a day and maybe there wouldn't be much air pollution on that day in the place you went because it's not constant all the time. And the other thing I can say is not every one is affected the same way. Some people are more sensitive than others. And what's presented in our research are the average effects among people in the study not that everyone is affected the same way.

But those caveats aside, the effects of the air pollution from these facilities are obvious and they impact a large proportion of the people exposed. And I believe they would not be tolerated by people who have more political clout and ability to harness resources to protect themselves. I believe that this system exists as it does currently because historically eastern North Carolina is part of what's called the black belt. Many people descended from slaves who worked on plantations in that region prior to the civil war.

It's politically disenfranchised, there's a great deal of intimidation that dates back to the slavery days and through Jim Crow and lynching and school segregation which is still a great problem. And the population there has not had the resources and has also had the historical exploitation and oppression that's preventing them from being able to insist upon having decent environmental regulations that would protect them from pollutants that would not be tolerated by others. So I think you know that's what we have is as a system would not exist if eastern North Carolina was similarly demographically and economically to for example the part of the state that I live in, the Piedmont in The Research Triangle area or Charlotte or Winston Salem or Greensboro or other areas that are better off.

The industry was only able to flourish in this manner because of the characteristics of the population in eastern North Carolina. I hope that addresses your question. I realize it may be broader but.

Mary O'Lone: Yes, I think it does. We did have a question about in your – in your declaration you mentioned that in Iowa the lagoons are underneath facilities. And, we were just wondering, you know, I mean I can imagine why they were not done in North Carolina but if you would like to expand on that statement

for us. Like what you know what is it – can you talk about it and how is it that that it didn't develop this way in North Carolina?

Steve Wing: Well one facet is that the water tables in eastern North Carolina are very high. So the hog waste lagoons in North Carolina store waste to some degree below ground but also above ground because the earth, earthen dams are mounded up above the grade of the land and that's a factor. There's also a factor of temperature, you know the climate's different. There may be other reasons. I'm really not familiar with how the engineering difference is developed between the two states in detail.

Mary O'Lone: OK. Did you all have any other questions? Is there anything else that you would like to add? I'm going to ask in a minute. Is there anything else that you would like to ask, I mean like to say Dr. Wing?

Steve Wing: Well, you know I realize that you have research papers and that that's not really the subject matter of your interest today. But since we're on the phone I did want to mention one thing about some more recent studies that as far as how the studies are designed, the older studies tend to be what we call cross sectional studies where exposed populations, meaning people who are living or attending schools near these facilities, are compared to other people who live or attend school further away. Those studies are common and widely used – it's a widely used design in epidemiology. But they are always subject to questions about how comparable the study population the exposed and unexposed populations are. And because there's no follow up in time they're – it's always possible that the people who have the illness had it before they were exposed because we don't follow them up.

But all the more recent studies they come from a design that is not so often used in epidemiology, but it's a very strong design. And those are the studies in which we measure the pollutants in people's neighborhoods and we show that their symptoms increased when the pollutant levels increased. And I mean by their symptoms their ability to engage in daily activities of daily living. Their mental health, their physical health including symptoms and blood pressure and so on and lung function.

And those studies rather than comparing people who live next to the hog operations to people who live elsewhere, we compared each person to her or himself meaning that they were their experiences when the pollutants were present compared to the same person's experience when the pollutants were lower or absent. And it means not only do we have certainty about the timing that the effects occur after the exposures but the other factors that might differ between exposing populations and unexposed populations in cross sectional studies. Things like diet, exercise, occupation, body weight and so on, medical history. Those are not factors in these more recent studies. And this is something that has been pointed out as a great strength of our more recent work that it really does resolve some of the questions that might be raised about the earlier studies.

I just wanted you to be aware of that.

Mary O'Lone: Thank you, yes. I actually had noticed that, but I can't remember which study it was where it was explained, you explained that.

Steve Wing: Oh good. OK, well I apologize for ...

Mary O'Lone: No I'm sort of going through I'm trying to remember which study it was that I was reading that had that explanation about how you were doing it, it seemed to make sense to me. So but thank you for you know pointing that out and pointing out the idea about the difference between the older studies and the newer ones and ...

Marianne Engelman Lado: Do you all have more questions? There are a couple of things that I wanted to make sure we got out but if you have more questions I'll wait.

Mary O'Lone: No. The only question that we had Marianne and I think it's probably it may be better addressed to you I don't know and it might be a quickie which is we were reading the change.org petition that Elsie Herring had written and in it she mentions that even when she that she smells the odors inside her house, even when she shuts the windows as the health department has advised. And so we were trying to – we've been looking around trying to figure out what you know where that came from the health department has advised. Like, do

you know what that means what that advisory is, how it comes out, how it got to her, what she's talking about?

So it's not necessarily for Dr. Wing unless he happens to know the answer, but which health department even?

Marianne Engelman Lado: I don't know off the top. Elizabeth, do you know off the top of your head?

Elizabeth Haddix: No.

Mary O'Lone: OK. Well then ...

Marianne Engelman Lado: We can ask Elsie though and you could interview Elsie. I'll also look back at her declaration to see if there's any more detail. I assume you've already done that.

Mary O'Lone: Yes, we did. Anyway just it was just if you happened to know the answer off the top of your head, otherwise yes, we can go down that path. OK, so you wanted to make sure some things got brought out Marianne?

Marianne Engelman Lado: Yes. And frankly I thought there were going to be more questions and if we had more time I think it would be important to ask more about some of Dr. Wing's studies. We talked a little bit about the methodology of the 2000 study as compared to the you know the disparities analyses. These are some of the seminal studies in the area and we have the good fortune I suppose of having them on the, you know, the particular facilities at issue here.

So sometimes when looking at whether facilities have an impact where by analogy or trying to say well something that happened somewhere else how does it affect here, there's a you know 2006 asthma symptoms study, the 2006 race poverty and potential exposure of middle school students, 2008 air pollution and odor, 2013 air pollution ISOs and blood pressure. Some of this was really path breaking community based participatory research. I also thought it could be helpful to get if you had any questions about the scope of Dr. Wing's expertise, you know to some degree the CV speaks for itself but I

want to make – you know if time permitted I would want to make sure that if you had any questions that would be in the record.

But let me – let me just start with a couple of things that we didn't touch on at all that might not be as self-evident. We talked about exhibit 2 which is the letter to Christine Lawson from December 2013 and Steve you asked about in that letter asked for the permitted (inaudible) to create records to document environmental and health impact. Was there – there was a large question about did you get any response at all but do you know are there more records available now? Was there any response to that particular request? What happened with that and why did you focus on it?

Steve Wing: I'm not aware that there have been any changes in the availability of records. At the time I was particularly looking for information on daily spraying, times and amounts of the application of liquid manure broadcast into the air in hopes that we might be able to use that information in our studies. But unfortunately I haven't been in a position to follow up on that.

Marianne Engelman Lado: We talked a little bit earlier about I think the whole – this interview started with why did you focus on swine and you mentioned the historical origins. Can you share – I guess I have two questions about the relationship between swine and poultry just to make sure this is discussed explicitly. One is the different geographic location of swine and poultry even as the poultry industry has expanded. So that's my first question.

Can you describe why we don't have perfect information about dry litter facilities for starters but also to the extent we know where those facilities are located, to what degree they're co-located and to what degree they're in different places. And then I want to talk – ask a little bit about cumulative impacts in co-location.

Steve Wing: Well, because the turkey and chicken facilities, the broiler facilities, are not permitted by the department of environment we don't have records of their locations. My understanding is that this goes back in part to post 9/11 rules that supposedly protect these facilities' locations because of concerns from bio terrorism, but I'm not able to rehearse in detail the rationale. But in any case

we don't have latitude, longitude coordinates for the poultry facilities except for those few that use liquid waste management systems and therefore trigger the DEQ permitting.

On their geographic location, just by county or by some remote imaging work that's being done, there are – there is a concentration in eastern North Carolina which includes the two top turkey-dense counties in the nation which are also in the top hog-dense counties in the nation, so there's clearly co-location. But there's also another area of fairly intense poultry production in the western Piedmont of the state in rural areas between the Research Triangle and Charlotte and north and south of that line and these are dry litter operations again, they're not liquid waste facilities. I think where they are co-located, where the swine and poultry facilities are co-located, they definitely have a potential for a cumulative impact because it means that there can be animal waste in the air blown from more directions.

And the poultry waste is actually harder to track as far as its spatial impact because being dry it can be transported some distance before it's applied to land. And it's that land application process that results in the most acute release of particles because the dry litter is broadcast from manure spreaders, but it doesn't necessarily occur at the site of the CAFO, at the site of the buildings. So there is, that's another issue that makes for complexity in conducting research on the spatial pattern of the impact.

Marianne Engelman Lado: Is there – speaking as an epidemiologist or from your experience, is there any way of taking account of the cumulative impact of poultry? If you were looking at the impact of these hog facilities in eastern North Carolina is there a way you could take account of the cumulative impact or you know assess multiple exposures and/or assess also other indicators of vulnerability in the population?

Steve Wing: Yes. In fact this is the subject of a grant application that we submitted to NIEHS in which we proposed to collect particles in people's neighborhoods where they live both swine and poultry and to analyze genetic markers in the particle samples for DNA from bacteria that only live in the gut of swine and other bacteria that only live in the guts of poultry so that we could partition

the particle mass present in the neighborhood into the proportion that comes from swine versus poultry. And then look at the impacts on people's health and quality of life when only swine is present, when only poultry is present and when they are both present together compared to when neither are present.

So we actually have proposed a method to do just what you asked about. Unfortunately that proposal, I have to say, was not funded. I submitted it around the same time that I wrote the letter to Christine Lawson. And sometimes I fear that there may be a connection between my having violated one of their rules and the fate of our proposal but I don't have any evidence of that.

Marianne Engelman Lado: In the absence of that new research, is there – it doesn't have to be a, you know, I think what you've called a cookbook method of the assessing multiple exposures but how would you take that into account or could you take cumulative impacts or ...

Steve Wing: Well one thing I would do is I would refer to testimony from residents which I think in my experience much of our formal research has validated what people have reported about their experiences. So we began – I began all this research being informed by the testimony of residents. And one of the things I paid attention to was that the stories people told, the accounts of their experiences were similar between people in different places that don't know each other which suggested to me that they weren't making it up. And there's plenty of testimony about the experience of living near both swine and poultry and I would begin there.

Marianne Engelman Lado: Elizabeth, do you have any questions you want to ask? I want to make sure we are able to wrap up?

Elizabeth Haddix: No, I think that does it. Thank you so much Steve.

Mary O'Lone: Anybody else have any last words, Marianne or Dr. Wing?

Marianne Engelman Lado: Well my – this is Marianne and you know thank you to Dr. Wing. And we will try to collect information and there were a few things that came

up during the course of the conversation and we'll try to get that. And if you have any additional questions Mary and Jeryl and others you know feel free to let me know.

Mary O'Lone: Yes. And once again Dr. Wing, thank you very much for your time and ...

Steve Wing: You're welcome. This is something that I believe is very important. I think your investigation holds out some hope for many thousands of people who are living with this pollution and we look forward to the outcome of your investigation.

Marianne Engelman Lado: Can I suggest one more question and this is for Steve. I'm aware that this was a complaint that you as a researcher and as a board member of North Carolina Environmental Justice network thought should be brought. Could you share with the Office of Civil Rights why you thought it was important to bring it?

Steve Wing: To bring a complaint?

Marianne Engelman Lado: Yes.

Steve Wing: Well, I feel that as I understand the history, that Title VI has been used in the past to address disparities in access to hospitals and schools and public transportation and other public facilities. And therefore there's a track record of bringing about some advancement of the persistent racial inequalities that exist in the United States through this law. But we haven't seen it impact the environment and we still have serious issues with environmental racism, environmental inequality.

And I think often it's very difficult for in the case where the pollution comes from corporate entities, it's very difficult to get them to change directly. But the appropriate – one appropriate way to bring about change is when there is a state agency that actually is responsible for setting the guidelines for these polluters. And it's not just about one facility at a time that might violate the Clean Water Act or the clean – or some other rule. It's about the system and permitting.

And in this case as I tried to explain earlier, I don't think we would have this system in North Carolina were it not for the presence of the black belt and its historical exploitation and lack of political and economic resources and its history of racial intimidation. So I think it's a very appropriate approach and it deals with fundamental issues of responsibility and holding our government accountable to democratic principles.

Marianne Engelman Lado: Thanks.

Mary O'Lone: Thank you. OK, all right well thank you very much again Dr. Wing.

Steve Wing: You're welcome. I'm happy to answer further questions if they come up later.

Mary O'Lone: Great. Thank you so much. Is that it?

Steve Wing: You're welcome and bye, bye.

Mary O'Lone: All right bye, bye. Thank you.

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